A. J. de BOER

Institute for Systematics and Population Biology (Zoölogisch Museum), University of Amsterdam

MCZ
LIBRARY
JUL 18 1995
HARVARD
UNIVERSITY

THE TAXONOMY AND BIOGEOGRAPHY OF THE CICADA GENUS *PAPUAPSALTRIA* GEN. N. (HOMOPTERA, TIBICINIDAE)

Boer, A.J. de, 1995. The taxonomy and biogeography of the cicada genus *Papuapsaltria* gen. n. (Homoptera, Tibicinidae). – Tijdschrift voor Entomologie 138: 1-44, figs. 1-190, table 1 [ISSN 0040-7496]. Published 15 June 1995.

The genus *Papuapsaltria* is erected for 18 species, distributed in New Guinea and several nearby islands. Three species (*Thaumastopsaltria nana* (Jacobi, 1903), *Baeturia phyllophora* Blöte, 1960, and *Baeturia ustulata* Blöte, 1960) are transferred to *Papuapsaltria* and redescribed, while 15 species (*P. angulata*, *P. baasi*, *P. bidigitula*, *P. brassi*, *P. dioedes*, *P. dolabrata*, *P. goniodes*, *P. lachlani*, *P. novariae*, *P. plicata*, *P. stoliodes*, *P. spinigera*, *P. toxopei*, *P. ungula*, and *P. woodlarkensis*) are described as new. *Baeturia famulus* Myers is brought into the synonymy of *P. nana* (Jacobi). The phylogeny of *Papuapsaltria* is discussed and some remarks are made on its phylogenetic relationships with some other New Guinean and Australian genera. A very short proximal spine on the fore femur is regarded an autapomorphy for the genus. Several monophyletic subgroups are recognised. Two species (*P. woodlarkensis* and *P. phyllophora*), missing the apomorphy of the genus and not clearly belonging to any of the subgroups, are preliminarily included. A key to the males and maps of distribution are presented.

A. J. de Boer, Instituut voor Systematiek en Populatie Biologie (Zoölogisch Museum), University of Amsterdam, P.O. Box 94766, 1090 GT Amsterdam, The Netherlands.

Key words. – *Papuapsaltria*, taxonomy, new genus, new species, biogeography, New Guinea.

The great majority of the tibicinid cicadas of New Guinea belong to the '*Baeturia* and related genera complex' as defined earlier (De Boer 1990) by an S-curved aedeagus with winged lateral crests. The genus *Papuapsaltria* is erected for 18 species, clearly belonging to that complex, that could not comfortably be accommodated in any of the existing genera. The species of *Papuapsaltria* are supposed to be closely related, which is corroborated by the distributions of a number of presumed apomorphous characters. Several monophyletic subgroups can be recognized, based upon apparently sound apomorphies. An unambiguous apomorphy for *Papuapsaltria* as a whole could not be found, however. Nevertheless, one character, a very short proximal spine on the fore femur, is shared by most of its species. Furthermore, this character is unique for *Papuapsaltria*.

The phylogenetic position of *P. phyllophora* (Blöte, 1960) and *P. woodlarkensis* sp. n. is very uncertain. These species are included in the genus, since they are more similar to the species of *Papuapsaltria* than to any other species of the '*Baeturia* and related genera complex'.

The phylogenetic relationships of *Papuapsaltria* are discussed; similarities in male operculum suggest a possible sister group relationship with the genus *Guineapsaltria* De Boer.

Papuapsaltria is distributed in New Guinea, including the nearby islands of Yapen, Normanby, and Waigeu, and has an endemic species on Woodlark island. One species, otherwise found in western New Guinea and on Yapen Island, is also recorded from Wetar island near Timor, but not known from any other islands of the Banda area. *Papuapsaltria* has most of its species in Papua New Guinea and seems to be absent from Cendrawasih and the most southern parts of central New Guinea.

MATERIAL AND METHODS

The material examined for this study is deposited in the following collections:

AMNH	American Museum of Natural History, New York
AMSA	Australian Museum, Sydney
BMNH	Natural History Museum [formerly: British Museum (Natural History)], London
BPBM	Bernice P. Bishop Museum, Honolulu
CAS	California Academy of Sciences, San Francisco
ISNB	Institut Royale des Sciences Naturelles de Belgique, Bruxelles

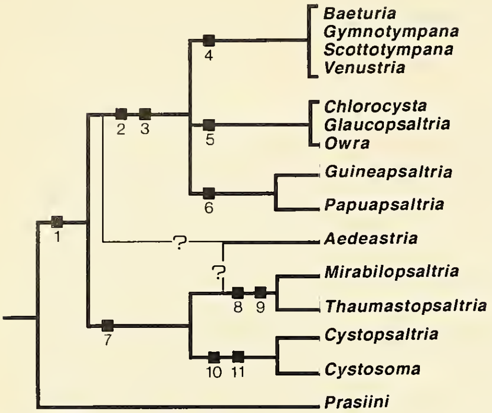


Fig. 1. Phylogenetic relationships of *Papuapsaltria.* Numbers refer to characters discussed in the text.

MCSN	Museo Civico di Storia Naturale 'G. Doria', Genova
Moul	Personal collection Mr M.S. Moulds, Sydney
MVMA	Museum of Victoria, Melbourne
NCSU	North Carolina State University Insect Collection, Raleigh
NMWC	National Museum of Wales, Cardiff
RMNH	Nationaal Natuurhistorisch Museum (formerly: Rijksmuseum van Natuurlijke Historie), Leiden
SMFD	Natur Museum und Forschungs Institut 'Senkenberg' Frankfurt am Main
SMNS	Staatliches Museum für Naturkunde, Stuttgart
SMTD	Staatliches Museum für Tierkunde, Dresden
TMB	Természettudomány Múzeum, Budapest
ZILS	Zoologiska Institutionen Zoologiska Museet, Lund
ZMAN	Instituut voor Systematiek en Populatie Biologie (Zoölogisch Museum), Amsterdam

The following sources have been used for tracing localities: 'Atlas van tropisch Nederland' (1938), 'The Times Atlas of the World Comprehensive Edition' (1968), 'Papua New Guinea a travel survival kit' (Wheeler 1988) and a 'List of New Guinea localities' published by the Bernice P. Bishop Museum (1966).

To examine the male genitalia, the pygofer was pulled out, after overnight softening, with a sharp needle inserted between the pygofer and the 8th abdominal segment. The aedeagus was pulled out at the same time, by inserting the needle between the claspers. Some of the terms used in the descriptions are explained in figs. 12 and 17. Body and tegmen lengths of all specimens were measured, other measurements are based on a maximum of ten specimens, when available.

PHYLOGENY

Papuapsaltria is a fairly heterogeneous genus, which forms part of a larger monophyletic group, defined earlier as the '*Baeturia* and related genera complex' (De Boer 1990). A phylogenetic analysis of this complex, using the computer program PAUP (Swofford 1993) is in preparation. The oriental Prasiini as defined by De Jong (1985), which form the most likely sister group of that complex, will be included as outgroup in this analysis. Preliminary results of the computer analysis indicate that the species of *Papuapsaltria* are closely related, that the genus is probably monophyletic and that it forms the sister group (or groups) of the monophyletic genus *Guineapsaltria* (De Boer 1993a).

The cladograms presented here, showing the phylogenetic position of *Papuapsaltria* within the '*Baeturia* and related genera complex' (fig. 1) and a tentative reconstruction of the relationships of the species of the genus (fig. 2), comply to a large extent with the afore mentioned PAUP analysis. Minor differences are due to the influence of several strongly homoplasious characters, as a result of which the most parsimonious trees do not recognize some of the obvious synapomorphies as such.

The phylogenetic position of *Papuapsaltria*

The presumed apomorphous characters indicated

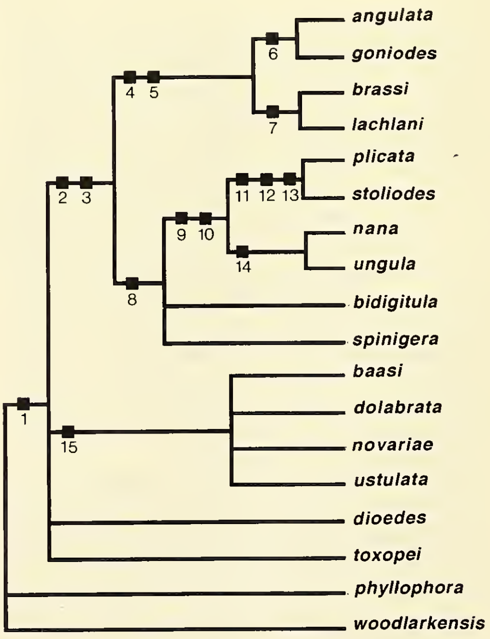


Fig. 2. Phylogenetic reconstruction of *Papuapsaltria.* Numbers refer to characters discussed in the text.

by numbers in the cladogram of fig. 1 are discussed in short. Many of these characters have been discussed earlier (De Boer 1990; 1991; 1992b; 1993a).

1. – Aedeagus S-curved and provided with wing-shaped lateral crests. This is the supposed apomorphy of the '*Beaturia* and related genera complex' (De Boer 1990). The Prasiini have a C-curved aedeagus without lateral crests, which is regarded as plesiomorphous.

2. – Surfaces of head and pronotum fairly smooth; pronotum generally without a distinct medial furrow. This could be two separate characters. Other genera of the complex and the Prasiini have a more wrinkled head and pronotum, while the pronotum generally has a distinct medial furrow, which is regarded as plesiomorphous. This character is not absolutely discriminating; anomalies sporadically occur in both subgroups.

3. – A fairly broad hyaline border along the hind margin of the tegmen. Other genera of the complex and the Prasiini have a very narrow border along the hind margin of the tegmen, which is regarded as plesiomorphous. This character too, is not absolutely discriminating. Furthermore, in *Baeturia* Stål, 1866, this border is quite narrow again, somewhat intermediate relative to the plesiomorphous state.

4. – A large male operculum; the medial margin of the operculum lies medially of the meracanthus. The phylogenetic relationships between the four genera that have this character are discussed in more detail elsewhere (De Boer 1995a). Other genera of the complex and the Prasiini have a generally smaller male operculum, of which the medial margin lies laterally of the meracanthus. Such small opercula are regarded as plesiomorphous. The larger opercula of *P. plicata* and *P. stoliodes* (see below) form two exceptions (see figs 59 & 73) which must be explained by paralellism.

5. – Tegmina with more than 8 apical areas and a more or less continuous band of subapical areas (see plate 22 figs. 2, 3, 6, and 7 in Moulds 1990).

6. – A very small male operculum with a rounded distal part. The distal part is often shorter than the basal part of the operculum. Though this character is not found in all species, it might indicate a sister group relationship between *Papuapsaltria* and *Guineapsaltria*. Such a relationship is in compliance with the most parsimonious computer analyses.

7. – A narrow tymbal cavity. This character is not present in all species of the group it is supposed to define.

8. – The absence of a distinct ridge along the tergite margin bordering the tymbal cavity. This character is also not present in all species of the group it is supposed to define.

9. – A very long first apical area of the tegmen (see figs. 4-5 De Boer 1992b). This character is shared by most species of *Thaumastopsaltria* Kirkaldy, 1900, and some species of *Mirabilopsaltria* De Boer, 1995, and is supposed to be synapomorphous for these two genera together, or for *Thaumastopsaltria* and a part of *Mirabilopsaltria*. In the latter case *Mirabilopsaltria* cannot be regarded as monophyletic (see De Boer 1995b).

10. – Apically pointed tegmina.

11. – Tegmina with reticulate venation (see plate 23 figs. 1-3 Moulds 1990).

The phylogenetic position of *Aedeastria* is ambiguous, as expressed by the question marks in fig. 1. *Aedeastria*, *Mirabilopsaltria*, and *Thaumastopsaltria* share a very similarly shaped angular male operculum and generally very distinct diverging fissures on the vertex. The distinct diverging fissures are possibly synapomorphous for these three genera together. However, nearly all species of *Mirabilopsaltria*, *Cystosoma*, *Cystopsaltria*, and *Thaumastopsaltria* share a strongly bent proximal spine on the fore femur, a character that is also widely distributed in the Prasiini and presumably plesiomorphous. This spine is generally more erect in *Aedeastria* and other genera of the complex, which could be a synapomorphy.

Ingroup phylogeny

A tentative cladogram of *Papuapsaltria* is given in fig. 2. Only characters that are supposed to be apomorphous are discussed here; these are indicated by numbers in the cladogram. The cladogram presented here differs in details from the most parsimonious reconstructions currently calculated by PAUP; differences are caused by a more parsimonious distribution of homoplasious characters. Such homoplasious characters, in which the species of *Papuapsaltria* differ from each other, and which are mentioned in the species descriptions, (e.g., postclypeus shape, number of tymbal ridges, size of auditory capsules, and presence or absence of apical lobes on the aedeagus) are not discussed, since they are presumably of a limited phylogenetic importance. These characters will be included in a final data matrix, which forms the basis for the current computer analysis. The most parsimonious solutions will be published later.

1. – A reduced, knobby, proximal spine on the fore femur (figs. 8-9). This character is regarded as a probable apomorphy for the genus *Papuapsaltria* as a whole, though possibly excluding *P. phyllophora* and *P. woodlarkensis* (see remark below). However, even when these two species are excluded from the genus, this character is not found in all species. *P. bidigitula*, *P. nana*, and to a lesser extent *P. baasi*, *P. dolabrata*, and *P. ustulata*, have a fairly long and generally pointed proximal spine on the fore femur. In these latter species the proximal spine is always distinctly shorter

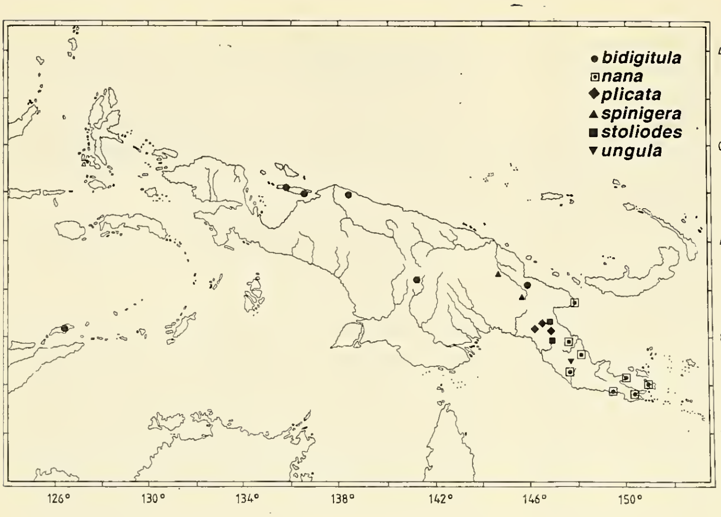


Fig. 3. Localities of *Papuapsaltria bidigitula*, *P. nana*, *P. plicata*, *P. spinigera*, *P. stoliodes*, and *P. ungula*.

than the distance to the middle spine, however, and it possibly represents just another state of the very same character. Only *P. phyllophora* and *P. woodlarkensis* have a distinctly longer spine; longer than the distance to the middle spine. This latter character is also found in related genera, and therefore presumably plesiomorphous. A reduced spine is unique for *Papuapsaltria*.

2. – A strongly convex distal margin of the pygofer, forming a sometimes weakly incurved distal lobe. The character is less clear in *P. angulata* and considered lost in *P. bidigitula* and *P. nana*. A similar, but smaller and more distinctly incurved, lobe was described for *Scottotympana biardae* De Boer, 1991 and *S. huibregtsae* De Boer, 1991, which must be explained by parallelism. The pygofer of *P. phyllophora* also has a distinctly convex, though much longer, distal margin, and it is not clear whether this fact indicates a close relationship between *P. phyllophora* and the group of 8 species defined by the here discussed apomorphy. The distal margin of the pygofer is only weakly convex in the remaining species of *Papuapsaltria* and in most of the related genera, which is supposedly the plesiomorphous state.

3. – A squarish clasper, without distinct dorsal crest, but with an angular distodorsal corner. This character is not recognized in *P. nana* and *P. ungula*, presumably caused by the development of a globularly rounded dorsodistal protrusion on the clasper (character 14).

4. – A distinct and inwards curving rectangular corner below the lateral protuberance of the pygofer. Due to this incurving corner the ventral part of the pygofer opening is somewhat horseshoe-shaped, with concave margins (fig. 22). The character is unique for four species, but not found in all specimens of one of these four (*P. angulata)*.

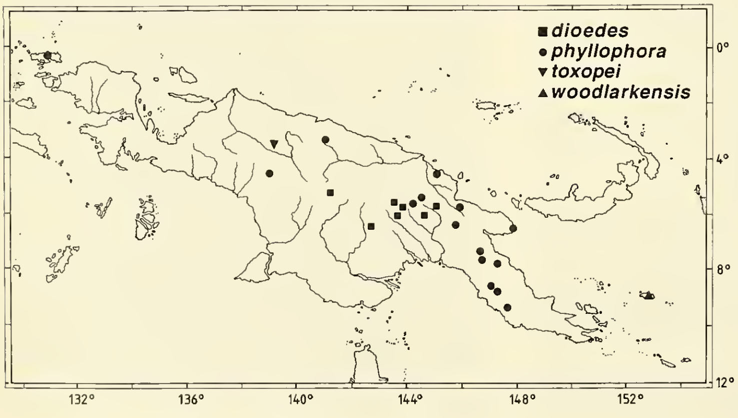


Fig. 4. Localities of *Papuapsaltria dioedes*, *P. phyllophora*, *P. toxopei*, and *P. woodlarkensis*.

5. – A square-shaped laminiform clasper, with a single, sharply pointed and outcurving, distoventral protrusion. The character is unique for four species.

6. – A nearly triangular distal part of the male operculum, with a very long and straight medial margin (figs. 17, 29). This operculum shape presumably indicates a sister group relationship between *P. angulata* and *P. goniodes.* Similarly shaped opercula occur in *P. dioedes* (fig. 163), *Guineapsaltria chinai* (Blöte, 1960), *Chlorocysta vitripennis* Westwood, 1851 and *Cystosoma saundersii* Westwood, 1842, which must be explained by parallelisms.

7. – A very long and stout aedeagus. Several other species of this genus (*P. angulata*, *P. baasi*, *P. dolabrata*, *P. novariae*, and *P. spinigera*) have a fairly long aedeagus as well, which stands erect between the claspers and reaches with its curved apical part well beyond the pygofer and anal valves. Similarly exposed aedeagi were also found in several species of *Gymnotympana.* The aedeagi of *P. brassi* and *P. lachlani* are extremely long, however, and presumably indicate the monophyletic origin of these two species.

8. – A thorn-shaped lateral protrusion on the clasper. The bluntly rounded lateral swelling in the clasper of *P. nana* is supposed to be homologous with this protrusion, while a slight swelling on the clasper of *P. woodlarkensis* might also be homologous, and thus indicate a relationship of that species to the species with this apomorphy. The more lobate lateral protrusions described for the claspers of some species of the genus *Thaumastopsaltria* (see De Boer 1992b) are considered to be non-homologous.

9. – A flattened and distinctly posteriorly projecting protuberance on the lateral lobes of the pygofer. The character is presumed to be lost in *P. nana*, though that species still has a fairly stout protuberance, compared to other species of the genus.

10. – The medial part of the clasper forming an almost transparent membrane, arching from the apex to the base of the clasper. This character is presumed lost by a reversal in *P. plicata.*

11. – A fairly large male operculum, with the medial margin of its distal part reaching medially of the meracanthus. Opercula that extend to medially of the meracanthus are synapomorphous for the genera *Baeturia*, *Gymnotympana*, *Scottotympana*, and *Venustria* (see above), but in these genera the distal part of the operculum is generally larger and of a different shape than in the two species of *Papuapsaltria* which share this apomorphy. Similarities with the four genera mentioned above must be explained by parallelism.

12. – A very stout and bicuspidate caudodorsal beak, separated from the pygofer by a distinct fold at its base (figs. 58, 69). A bicuspidate, though differently shaped, caudodorsal beak was found in two species groups of *Baeturia*: the *B. nasuta* group and the *B. viridis* group (De Boer 1982; 1992a), which must be explained by parallelism or convergence. The fold at the base of the beak is unique for these two species of *Papuapsaltria.*

13. – An aedeagus with a pair of distinct and angular dorsal ridges. Less well-developed dorsal ridges, either single or paired, occur in many other species of *Papuapsaltria* and in many related genera.

14. – A globularly rounded dorsodistal protrusion on the clasper (figs. 77, 89). A similar protrusion was found in *Aedeastria hastulata* De Boer, 1993, and several species of *Gymnotympana*, which must be explained by parallelisms.

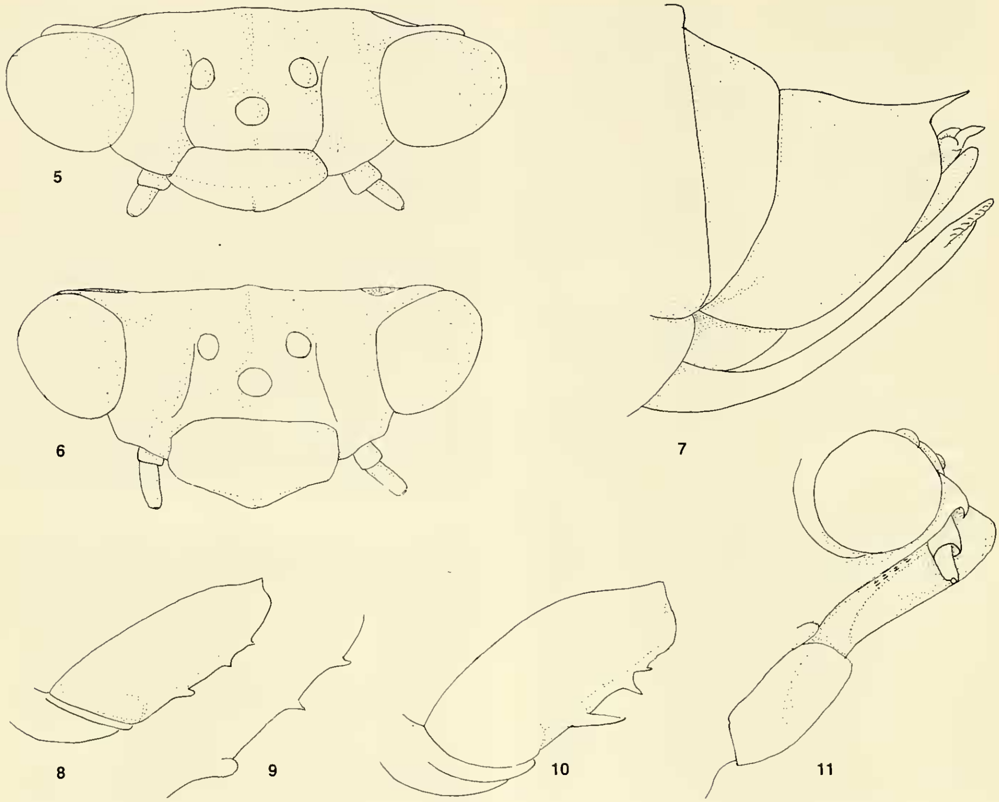
15. – Claspers of which the dorsal crests closely encircle the aedeagus as a short shaft. The claspers of the four species with this character are very similar in other respects, mainly differing in the angle between their apical and basal parts. The character is unique for these four species.

Remark: The phylogenetic positions of *P. phyllophora* and *P. woodlarkensis* are very uncertain. The shape of the head and the operculum of these species suggest that they either belong to *Papuapsaltria* or to *Guineapsaltria.* In spite of the fact that these two species have a fairly long proximal spine on the fore femur, they are preliminary included in *Papuapsaltria*, since their ocelli are more closely together than is common in *Guineapsaltria* and they do not share the distinct subapical lobe on the aedeagus, which is regarded synapomorphous for that genus (De Boer 1993a). The inclusion of these two species in *Papuapsaltria* is supported by the preliminary results of the computer analysis; in several of the most parsimonious reconstructions these species appear at various places between the other species of the genus.

Discussion of other characters of possible phylogenetic relevance

Several other characters, not included in the phylogenetic discussion, are discussed below, since they are supposed to be indicative of a close relationship between species of *Papuapsaltria*:

Cicadas generally have eight apical areas in the tegmen, but several species of *Papuapsaltria* have a different number of apical areas, a number which often even varies between the right and left tegmen of individuals. *P. novariae* has 9 apical areas, this number varies between 8-9 in *P. nana*, between 8-10 in *P. lachlani* and *P. plicata*, and between 9-12 in *P. goniodes. P. stoliodes* has generally 8-9 apical areas in the tegmen, but 11-12 in one specimen, and one specimen of *P. baasi* has 7 apical areas in the right tegmen. Such variations only sporadically occur in related genera and the fact that it occurs relatively often in



Figs. 5-11. – 5, head in dorsal view *P. goniodes*, holotype; 6, head in dorsal view *P. nana*, Popondetta; 7, female genital segment in lateral view *P. goniodes*, Daulo; 8, fore femur *P. goniodes*, holotype; 9, detail fore femur *P. goniodes*, holotype; 10, fore femur *P. woodlarkensis*, holotype; 11, head in lateral view *P. goniodes*, holotype.

Papuapsaltria might indicate a close relationship between its species.

Tegmina with a more strongly variable number of apical areas (10-15), are characteristic for *Thaumastopsaltria* (De Boer 1992b), a monophyletic group of four *Gymnotympana* species (De Boer 1995a), a presumed monophyletic group consisting of *Chlorocysta*, *Glaucopsaltria*, and *Owra* (for figs. see Moulds 1990), and for two species of *Mirabilopsaltria* (De Boer 1995b).

Apical and ulnar areas are generally long and slender in *Papuapsaltria* (figs. 21, 65), but distinctly shorter in *P. baasi*, *P. dolabrata*, *P. novariae*, *P. phyllophora* and *P. ustulata* (fig. 137). The tegmina of these five species resemble those of *Guineapsaltria*.

P. dioedes and *P. woodlarkensis* have very similar opercula, which might indicate a close relationship between these species; the lateral margin of the distal part runs almost straight to the distolateral corner of the basal part (figs. 163, 172).

Apart from *P. plicata*, *P. phyllophora*, *P. stoliodes*, *P. toxopei*, *P. woodlarkensis*, and some specimens of *P. bidigitula* the species of *Papuapsaltria* have a very slender caudodorsal beak (compare figs. 12 and 53), often with concave margins in dorsal view (cf. fig. 44). Such an extremely slender caudodorsal beak only sporadically occurs in related genera.

Biogeography

Papuapsaltria is widely distributed throughout the greater part of New Guinea and further recorded from the islands of Normanby, Roon, Waigeu, Woodlark, and Yapen (figs. 3-4, 32, 129). The genus appears to be absent from Cendrawasih (the Vogelkop peninsula), the southern parts of central New Guinea, and the central mountain ranges of western New Guinea. A record of *P. bidigitula* from Wetar island is considered doubtful, since that species is not known from any of the other Banda islands.

The cicada genera that occur on New Guinea are not evenly distributed over the island. The various genera are generally concentrated with most, and often endemic, species in different parts of the island. Most of these parts, thus recognised as areas of endemism, coincide with fragments of a historic volcanic island arc, known as the Outer Melanesian Arc. Over the last 25 million years or so these fragments have collided at various times and localitions with the northern craton of the Australian continent (for geological information see Pigram & Davies 1987). These facts suggest that the various New Guinean genera evolved on different island arc fragments, prior to the collision of these fragments with Australia. It was inferred (De Boer 1994; 1995a), that the genera *Diceropyga*, *Gymnotympana*, and *Thaumastopsaltria* probably evolved on the East Papua Composite terrane, which collided about 15 My ago with New Guinea and now forms the greater part of the Papuan peninsula (Pigram & Davies 1987). Similarly *Rhadinopyga* and possibly also *Aedeastria* might originate from any of two microcontinents now forming Cendrawasih, these genera concentrate in western New Guinea (De Boer 1992b; 1993b; 1994). The occurrences of such genera outside their presumed area of origin is supposed to have resulted from dispersal since the time of collision of these areas. Such a hypothesis is corroborated by the fact that those species that do occur outside the areas of presumed origin generally have a relatively wide distribution.

The distribution of the genus *Papuapsaltria* does not readily suggest an origin on any of the arc-fragments or microcontinents that collided with Australia. Certainly, most species of *Papuapsaltria* are found in Papua New Guinea. Of its 18 species, eleven occur in Papua New Guinea, and nine are endemic there. Five of these endemics are restricted to the Papuan peninsula. These numbers of endemics seem to indicate that *Papuapsaltria*, or at least part of that genus, also originates from the East Papua Composite terrane. Several species may have dispersed from the Papuan peninsula to the mountains of western Papua New Guinea. It is remarkable that many species of *Papuapsaltria* were collected from montane altitudes (table 1), so that such a dispersal, from one montane area to another, might have been easily achieved.

However, *Papuapsaltria* has no less than five endemic species in northwestern New Guinea, four of which presumably form a monophyletic group. Furthermore, disregarding the record from Wetar, *P. bidigitula* could also be an endemic of northwestern New Guinea. The distribution of these endemics cannot easily be explained by a dispersal from the Papuan peninsula and a different area of origin, on another fragment of the historic island arc, must certainly be considered for these species. The endemics of northern New Guinea, or at least some of them, could originate either from the Gauttier or Torricelli terranes, or from both. These terranes formed a, probably more or less continuous, part of the Outer Melanesian Arc and collided at about 10 My ago with New Guinea (Pigram & Davies 1987).

Table 1. Altitudinal ranges of the species of *Papuapsaltria*

P. angulata	700-2070 m
P. baasi	100-750 m
P. bidigitula	0-1350 m
P. brassi	1650-1950 m
P. dioedes	2280-2950 m
P. dolabrata	0-2500 ft
P. goniodes	700-3000 m
P. lachlani	400-1400 m
P. nana	0-150 m
P. novariae	1200-2530 m
P. phyllophora	0-1800 m
P. plicata	2070-2800 m
P. spinigera	700-1550 m
P. stoliodes	1100-2000 m
P. toxopei	1800 m
P. ungula	450 m
P. ustulata	1300-1500 m
P. woodlarkensis	100 m

As explained above, the monophyly of *Papuapsaltria* is far from certain. The apparent dual origin of the genus, on different parts of the Outer Melanesian Arc, is another factor shedding doubt on its assumed monophyly.

TAXONOMY

Genus ***Papuapsaltria*** gen. n.

Type species. – *P. angulata* sp. n.

Description

The species of *Papuapsaltria* are mostly fairly small. Males generally have a body length shorter than 2 cm and, more often, do not exceed 1.5 cm. Only *P. dioedes* is distinctly larger, with a body length of 20.0-26.5 mm. Body generally ochraceous to reddish brown and often with traces of green, but without special colour markings, though abdomen sometimes with reddish segmental hind margins. Many of the species possibly entirely green when alive. Females of most species, on average, slightly smaller than males but with more robust head and thorax and slightly longer tegmina. Tegmina of males 1.0-1.3 × as long as body length, of females 1.5-1.6 ×. Male abdomen distinctly longer (1.2-2.2 ×) than head and thorax, of females 1.0-1.3 ×. Head fairly broad and short (figs. 5-6), only slightly narrower than anterior part of pronotum, 2.3-2.9 × as wide as long and 1.2-1.5 × as wide as distance between eyes. Postclypeus 2.0-3.3 ×

as wide as long, oblong in dorsal view and weakly protruding, and not swollen ventrally; anterior margin (lateral view) straight or weakly concave (fig. 11). Sides of postclypeus fairly smooth, but often with some weak furrows and with about 6 rows of short parallel ridges in a narrow band along the lorum. Vertex fairly broad and smooth, though with distinct medial fissure. Diverging fissures from center of head to corners of postclypeus generally weakly developed, almost obsolete. Vertex 1.5-2.2× as wide as long; 1.3-2.1× as wide as postclypeus and 1.9-2.5× as wide as eye. Ocelli small and fairly close together. Distance between lateral ocelli 1.2-2.6× the width of frontal ocellus and about as long as (0.8-1.2×) distance between lateral ocellus and eye. Pronotum 2.2-2.9× as wide as long and smoothly vaulted, without distinct medial furrow. Pronotal collar laterally angularly amplified, and slightly curving down at its anterior margin. Tegmina and wings hyaline, venation ochraceous. Tegmina generally with 8, but fairly often more (9-12) apical areas, though rarely with subapical areas. Tegmen with distinct hyaline costal area and generally a broad hyaline border along hind margin. Wings with 6 apical areas, a distinctly broader hyaline border, and large anal fields. Legs ochraceous and unmarked. Fore femur long and slender, with row of 3 erect spines. Proximal spine in most species very short and apically rounded, only slightly longer than middle spine and generally distinctly shorter than distance to middle spine (figs. 8-9). Tymbal with 5-9 parallel sclerotized ridges. Short intercalary ridges can often be discerned, forming a darkened band at half-width across the tymbal. Opercula generally very small. Basal part of operculum slightly vaulted with two rounded elevations, and upcurved at distolateral corner into distinct crest rounding that corner. Lateral part of that crest often short and knobby, distal part generally fairly long and gradually amplifying into distal part of operculum (cf. fig. 17), though in some species shorter and abruptly amplifying into distal part (cf. fig. 29). Distal part of operculum angularly oblong, in most species shorter than basal part. Male operculum not, or only partly, covering tymbal cavity in ventral view, often leaving greater part of folded membrane exposed. Its lateral margin straight and slightly directed mesiad. Operculum shorter than meracanthus and generally not extending medially beyond meracanthus. *P. plicata* and *P. stoliodes* with distinctly larger opercula. Female operculum shorter, but generally of same shape as that of male. Male abdomen very delicate, in the larger sized species distinctly inflated, in small sized species not notably inflated and then of almost the same shape as that of female. First tergite in male fairly short medially, sometimes hidden under metanotum. Medial part of second tergite less than 1.5× as long as lateral parts, proximal margin of second tergite weakly convex, sometimes slightly concave medially (figs. 68, 177) and almost straight between auditory capsules and sternite 2, forming a distinct ridge along tymbal cavity (cf. fig. 17). Lateral parts of 2nd tergite weakly swollen at anterior margins and almost adjacent to tymbals, leaving a narrow gap between tymbal and 2nd tergite. First sternite swollen and bluntly rounded posteriorly. Female abdomen more robust than that of male, with slender pygofer. Ovipositor sheaths reaching beyond apex of bluntly rounded caudodorsal beak. Male pygofer globularly rounded, convexly rounded dorsally, and often with distinctly convex distal margins. Caudodorsal beak short and straight, not curved over basal part of claspers or anal valves (much larger and strongly bent in *P. plicata* and *P. stoliodes*). Claspers fairly short and directed downwards, fused, or nearly fused, at base, forming a ring-shaped collar around base of anal valves. Clasper generally sharply pointed at apex, and sometimes with sharply pointed lateral protrusion. Apical part of clasper generally with slender and sharply edged clasper hollow. Aedeagus S-curved with winged lateral crests, often with 1 or 2 dorsal ridges, and sometimes with small subapical lobe (aedeagus of *P. phyllophora* strongly deviating). Aedeagal pore round.

Gender: Feminine.

Key to the males

1. Clasper distinctly bicuspidate, with sharply pointed apical protrusion and distinct, pointed or rounded, lateral protrusion. (cf. fig. 56) 2
– Clasper not bicuspidate, with only one pointed and generally apical protrusion 7
2. Opercula reaching medially of meracanthus (figs. 59, 73). Pygofer with sharp fold at base of caudodorsal beak (figs. 54, 66). Caudodorsal beak bicuspidate (figs. 58, 69); broad in lateral view. Aedeagus with short and broad lateral crests and distinct dorsal ridges (figs. 62, 71) 3
_ Opercula not reaching medially of meracanthus (cf. fig. 82). Pygofer without sharp fold at base of caudodorsal beak. Caudodorsal beak not bicuspidate; slender in lateral view (cf. figs. 78-79). Aedeagus with long and slender lateral crests and either without, or with weak, dorsal ridges 4
3. Operculum reaching beyond apex of meracanthus (fig. 73). Claspers very broad towards apex, ending in two short thorn-shaped protuberances; medial part of clasper not membranous (fig. 72). Auditory capsules weakly swollen. Body length under 19.5 mm .... *P. plicata*
– Operculum not reaching beyond apex of meracanthus (fig. 59). Claspers with very long and slender apical protrusion and shorter lateral protrusion; medial part of clasper membranous (fig.

56). Auditory capsules distinctly swollen. Body length over 19.5 mm .... *P. stoliodes*

4. Clasper with globularly swollen dorsodistal protrusion and a very long spiny apical protrusion; medial part of clasper membranous (figs. 77, 89 arrow). Tegmen with fairly narrow hyaline border along hind margin 5

– Clasper without globularly swollen dorsodistal protrusion and a fairly short apical protrusion; medial part of clasper not membranous (figs. 100, 104). Tegmen with broad hyaline border along hind margin 6

5. Caudodorsal beak very long and slender in lateral view, more than 3 × as long as broad (fig. 78). Distal margin of pygofer strongly convex. Lateral lobe of pygofer with long, slender, and distinctly posteriorly projecting protuberance. Clasper with sharply pointed lateral spine (fig. 77). Folded membrane visible in ventral view. Tymbal with 8 ridges. Auditory capsules distinctly swollen. Anterior margin of postclypeus almost continuous with anterior margins of vertex lobes. Body length under 15 mm .... *P. ungula*

– Caudodorsal beak fairly short, about 2 × as long as broad (fig. 84). Distal margin of pygofer weakly convex. Lateral lobe of pygofer with broadly rounded, hardly protruding protuberance. Clasper with bluntly rounded lateral protrusion (fig. 89). Folded membrane not visible in ventral view. Tymbal with 5 ridges. Auditory capsules hardly swollen. Anterior margin of postclypeus angularly curving back at lateral corners, forming a right angle with anterior margins of vertex lobes. Body length over 15 mm .... *P. nana*

6. Clasper base forming broad ring-shaped collar with two finger-shaped dorsomedial protrusions around base of anal valves (fig. 100). Lateral protrusion of clasper shorter, or as long as, apical protrusion. Tymbal with 6 ridges. Folded membrane visible in ventral view. Caudodorsal beak pointed at apex. Lateral protuberance on pygofer lobe broad; pygofer forming a distinct angular corner under lateral protuberance (fig. 93) ....
.... *P. bidigitula*

– Clasper base not forming a distinct collar around base of anal valves (fig. 104). Lateral protrusion of clasper distinctly longer than apical protrusion. Tymbal with 8 ridges. Folded membrane not visible in ventral view. Caudodorsal beak rounded at apex. Lateral protuberance on pygofer lobe narrow; pygofer forming a very small angular corner under lateral protuberance (fig. 105) ....*P. spinigera*

7. Claspers parallel, only weakly diverging near apices (cf. fig. 162) 8

– Claspers strongly diverging towards apices (cf. fig. 15) 12

8. Tymbal with 6 ridges. Caudodorsal beak slender in lateral view (cf. fig. 157) 9

– Tymbal with 7 or 9 ridges. Caudodorsal beak fairly broad in lateral view (cf. fig. 183) 11

9. Body length over 19.5 mm. Distal part of operculum fairly long, longer than basal part, and with long medial margin (fig. 163). Pygofer with narrow protuberance on lateral lobe (fig. 157). Auditory capsules hardly swollen. Aedeagus not incised at apex (fig. 158). Tegmina with long and slender apical and ulnar areas and a broad hyaline border along hind margin (cf. fig. 21) ....
.... *P. dioedes*

– Body length under 16.5 mm. Distal part of operculum shorter than basal part, and with short medial margin (fig. 136). Pygofer with broad protuberance on lateral lobe (cf. fig. 134). Auditory capsules distinctly swollen. Aedeagus weakly incised at apex (cf fig. 131). Tegmina with short apical and ulnar areas and a fairly narrow hyaline border along hind margin (cf. fig 137) 10

10. Tegmina with 9 apical areas. Sternites 1 and 2 not adjacent (fig. 136). Dorsal margin of clasper in lateral view forming a right angle with ring-shaped clasper base .... *P. novariae*

– Tegmina with 8 apical areas. Sternites 1 and 2 almost adjacent (fig. 145). Dorsal margin of clasper in lateral view almost continuous with ring-shaped clasper base .... *P. dolabrata*

11. Body length under 15 mm. Tegmina with short apical and ulnar areas (cf. fig. 137), costa distinctly swollen at pentagonal first ulnar area (fig. 176). Anterior margin of postclypeus almost continuous with anterior margins of vertex lobes. Proximal spine of fore femur fairly long, as long as, or longer than distance to middle spine. Tymbal with 9 ridges. Folded membrane between abdomen and operculum not visible in ventral view. Aedeagus very broad in lateral view and pick-shaped, with long and slender downwards directed apical part, square-shaped membranous dorsal part, and short and broad lateral crests (fig. 186). Clasper with straight and rounded apical part, and forming incurving dorsodistal protuberance over aedeagus (fig. 185) ....
....*P. phyllophora*

– Body length over 19 mm. Tegmina with long and slender apical and ulnar areas (cf. fig. 21), costa not swollen at quadrangular first ulnar area (cf. fig. 175). Anterior margin of postclypeus angularly curving back at lateral corners, forming a right angle with anterior margins of vertex lobes. Proximal spine of fore femur very short, distinctly shorter than distance to middle spine. Tymbal with 7 ridges. Folded membrane between abdomen and operculum visible in ventral view.

Aedeagus slender S-curved with long and slender lateral crests. Clasper with recurving and pointed apical part, not forming dorsodistal protuberance over aedeagus (fig. 152) .... *P. toxopei*

12. Distal margin of pygofer weakly convex between base of caudodorsal beak and lateral protuberance. Angular corner under lateral protuberance of pygofer not curved inwards or absent, or strongly folded inwards and then thorn-shaped; ventral half of pygofer opening generally not horseshoe-shaped (cf. fig. 167) 13

– Distal margin of pygofer strongly convex between base of caudodorsal beak and lateral protuberance. Angular corner under lateral protuberance of pygofer strongly curved inwards; ventral half of pygofer opening somewhat horseshoe-shaped (fig. 22) 16

13. Body length over 17 mm. Folded membrane between operculum and abdomen visible in ventral view. Tegmina with long and slender apical and ulnar areas, and a broad hyaline border along hind margin.(cf. fig. 21) 14

– Body length under 15 mm. Folded membrane between operculum and abdomen not visible in ventral view. Tegmina with short apical and ulnar areas, and a fairly narrow hyaline border along hind margin. (cf. fig. 137) 15

14. Clasper squarish, laminiform, with thorn-shaped outcurving protrusion on ventral margin (fig. 15). Pygofer with distinct rectangular corner under lateral lobe (fig. 12). Distal part of operculum almost triangular, with very long medial margin; lateral margin concave to distolateral corner of operculum base (fig. 17). Proximal spine of fore femur short, much shorter than distance to middle spine. Auditory capsules distinctly swollen. Caudodorsal beak slender in lateral view (fig. 12) ... *P. angulata*

– Clasper hook-shaped, with sharply pointed downwards directed apical part (fig. 171). Pygofer with thorn-shaped, inwards curving, protuberance under lateral lobe (fig. 167). Distal part of operculum oblong, with short medial margin; lateral margin almost straight to distolateral corner of operculum base (fig. 172). Proximal spine of fore femur fairly long, longer than distance to middle spine. Auditory capsules weakly swollen. Caudodorsal beak broad in lateral view (fig. 166) .... *P. woodlarkensis*

15. Pygofer with distinct rectangular corner under lateral lobe. Tymbal with 7-8 ridges. Anterior margin of postclypeus almost continuous with anterior margins of vertex lobes. Sternites 1 and 2 adjacent. Aedeagus with small subapical lobe (fig. 114) .... *P. ustulata*

– Pygofer without rectangular corner under lateral lobe. Tymbal with 6 ridges. Anterior margin of postclypeus angularly curving back at lateral corners, forming a right angle with anterior margins of vertex lobes. Sternites 1 and 2 not adjacent. Aedeagus without subapical lobe (fig. 124) .... *P. baasi*

16. Body length over 18 mm. Distal part of operculum fairly long, longer than basal part. Sternites 1 and 2 widely separated. Aedeagus reaching not, or only just, beyond apex of anal valves (fig. 24) *P. goniodes*

– Body length under 16 mm. Distal part of operculum shorter than basal part. Sternites 1 and 2 almost adjacent. Aedeagus reaching far beyond apex of anal valves (cf. fig. 34) 17

17. Pygofer lobe with broad laminiform lateral protuberance (fig. 34). Clasper with concave distal margin (fig.42). Claspers strongly diverging towards apices (fig. 38). Clsaper base forming a low collar around base of anal valves .... *P. lachlani*

– Pygofer lobe with narrow lobate lateral protuberance (fig. 45). Clasper with convex distal margin (fig. 47). Claspers weakly diverging towards apices (fig. 46). Clasper base forming a broad collar around base of anal valves .... *P. brassi*

Papuapsaltria angulata sp. n.
(figs. 12-20, 32)

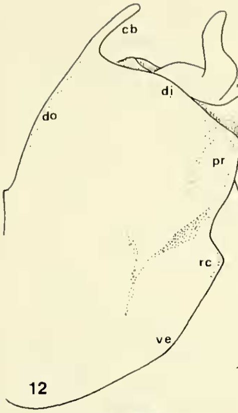
Type material. – Holotype ♂: 'N Guinea: NE Bulldog Rd. 2070 m 60 km S. Wau' [print]; '22-

Figs. 12-20. *Papuapsaltria angulata* sp. n. – 12, pygofer in lateral view, paratype; 13, male caudodorsal beak in dorsal view, paratype; 14, pygofer from aslant, paratype; 15, claspers, paratype; 16, female operculum, Nami Creek; 17, male operculum, paratype; 18, detail aedeagus apex, holotype; 19, aedeagus in lateral view, holotype; 20, female caudodorsal beak in dorsal view, Nami Creek.

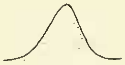
Lettering: bp = basal part of operculum; c = crest around distolateral corner of basal part of operculum; cb = caudodorsal beak; di = distal margin of pygofer; dm = distomedial margin of operculum; do = dorsal margin of pygofer; dp = distal part of operculum; fm = folded membrane; lm = lateral margin of operculum; m = medial margin of operculum; me = meracanthus; pr = protuberance on lateral lobe of pygofer; rc = rectangular corner below lateral protuberance of pygofer; ve = ventral margin of pygofer.

Figs. 22-31. *Papuapsaltria goniodes* sp. n. – 22, pygofer from behind, Ayura; 23, pygofer from aslant, Ayura; 24, pygofer in lateral view, Daulo, arrow indicating distal lobe; 25, male caudodorsal beak in dorsal view, Daulo; 26, claspers, Daulo; 27, aedeagal apex, holotype; 28, aedeagus in lateral view, holotype; 29, male operculum, Daulo; 30, female caudodorsal beak in dorsal view, Daulo; 31, female operculum, Daulo.

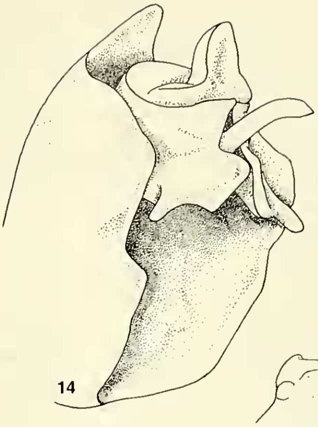
Lettering: st 1 = sternite 1; st 2 = sternite 2.



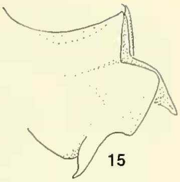
12



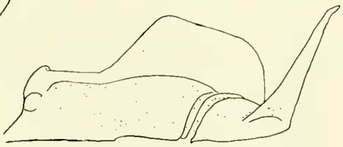
13



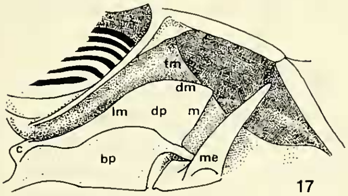
14



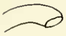
15



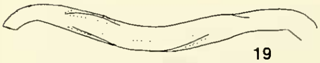
16



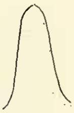
17



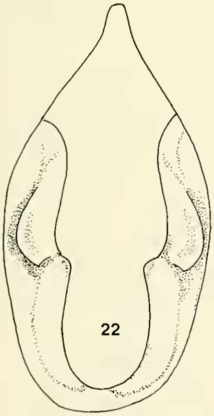
18



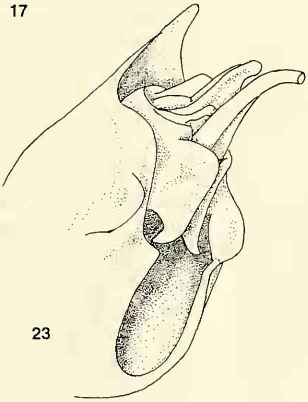
19



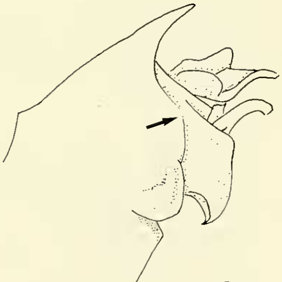
20



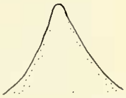
22



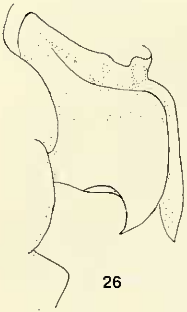
23



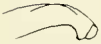
24



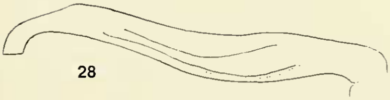
25



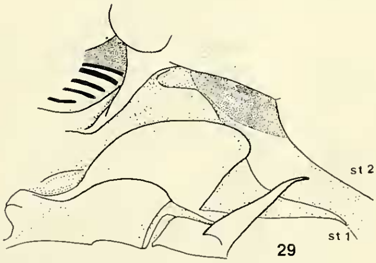
26



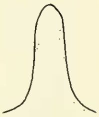
27



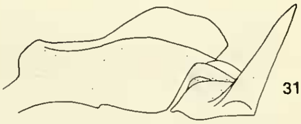
28



29



30



31

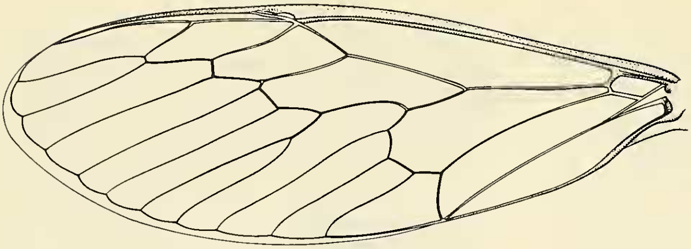


Fig. 21. *Papuapsaltria goniodes* sp. n. Left tegmen, male Mt. Otto.

31.v.1969' [print]; 'J. Sedlacek Collector Bishop Mus.' [print], BPBM. – Paratypes: PAPUA NEW GUINEA: same data as holotype, 1 ♀, BPBM; Nami Ck., Wau, 1700-1800 m, 17.ix.1965, J. Sedlacek, 1 ♂, ZMAN; Nami Ck., 6 km W. Wau, 1700 m, 12.vi.1962, J. Sedlacek, 1 ♀, BPBM.

P. angulata is the type species of *Papuapsaltria*. Males are easily recognized by the broad and rectangular clasper, with slender, sharply pointed, and laterally bending ventral protrusion.

Description

Body light brown and unmarked. Females slightly larger than males, with distinctly longer tegmina. Tegmina of males 1.1 × as long as body length, of females 1.4 ×. Male abdomen 1.7-1.8 × as long as head and thorax, of females 1.2 ×.

Head: Ochraceous brown, without setae. Postclypeus angularly protruding, anterior margin angularly bent medially, and almost continuous with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) weakly concave. Distance between lateral ocelli 0.9-1.0 × as long as distance between lateral ocellus and eye, and 1.9-2.3 × as wide as frontal ocellus.

Tegmina: Hyaline, with 8 long and slender apical areas, a broad hyaline costal area and a very broad hyaline border along hind margin.

Legs: Fore femur with three very short, about equally long, erect spines. Proximal spine finger-shaped and distinctly shorter than distance to middle spine.

Tymbal: Five parallel transverse sclerotized ridges spanning the tymbal from dorsal to ventral margin and a 6th, most proximal, ridge almost reaching ventral margin. Intercalary ridges can hardly be discerned.

Opercula: Male operculum (fig. 17) not covering tymbal cavity in ventral view, leaving a wide gap between operculum and abdomen; folded membrane clearly visible in ventral view. Distal part of operculum longer than basal part and almost triangle-shaped, medially elongate. Lateral margin bending convexly into straight distal margin and concavely into crest of basal part. The lateral part of this crest short and knobby. Distomedial corner rectangular. Medial margin long and straight. Meracanthus longer than operculum, but not reaching to abdomen. Female operculum (fig. 16) much shorter than that of male, with oblong shaped distal part.

Abdomen: Male abdomen inflated. First tergite short, partly hidden under metanotum. Medial part of 2nd tergite less than 2 × as long as lateral part. Anterior margin of 2nd tergite distinctly concave medially. First and 2nd sternite adjacent. Auditory capsules weakly developed, not visible in dorsal view. Female abdomen very slender. Female caudodorsal beak (fig. 20) slender, pointed at apex. Ovipositor sheaths just reaching to apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 12. Dorsal margin weakly convex, continuous with short and very slender caudodorsal beak. Distal margin weakly convex between caudodorsal beak and lateral protuberance, forming a weakly developed distal lobe. Caudodorsal beak in dorsal view (fig. 13) short and slender, triangle-shaped and rounded at apex. Lateral lobe of pygofer curving outwards towards ventral margin, forming a weakly developed, but broad and rectangular laminiform protuberance. Pygofer forming a very distinct rectangular and slightly incurving corner just below this protuberance (figs. 12, 14). Ventral margin of pygofer angularly convex. Ventral half of pygofer opening in holotype horseshoe-shaped (seen from behind cf. fig. 22), with broad, rounded, basal margin and concave lateral margins, incurving towards rectangular corners, but narrower, V-shaped with converging margins, in paratype. Clasper (fig. 15) laminiform, with almost rectangular dorsodistal corner and straight distal margin, and with a sharply pointed thorn-shaped protrusion at half-length of ventral margin. Protrusion of clasper bending strongly outwards and reaching laterally beyond pygofer margin. Rectangular dorsodistal corner of clasper bending mesiad, distally of aedeagus and supporting aedeagus in upright position. Claspers strongly diverging towards ventrodistal corners. Clasper base forming a smoothly rounded, though discontinuous ring around base of anal valves; with dorsal parts of clasper bases curving mesiad, proximally of aedeagus, and almost touching each other. Aedeagus standing erect between claspers, fairly close to anal valves, but with apical part curving away, reaching beyond distal margins of claspers. Aedeagus (fig. 19) long and slender, weakly S-curved, with long slender lateral crests and a pair of weakly developed dorsal crests, restricted to its distal half. Aedeagus strongly curved near apex. Aedeagal pore round (fig. 18).

Measurements: Body length ♂: 17.5 & 18.6 mm, ♀ 19.5 mm; tegmen length ♂: 21.2 mm, ♀: 28.1 mm; head length ♂: 1.2 mm, ♀: 1.2 & 1.5 mm; pronotum length ♂: 1.7 mm, ♀: 2.0 mm; mesonotum length ♂: 3.5 mm, ♀: 5.7 mm; head width ♂: 3.1 & 3.3 mm, ♀: 3.9 mm; width of pronotal collar ♂: 4.3 & 4.8 mm, ♀: 6.2 mm.

Distribution (fig. 32). – Central Papua New Guinea, the most western part of the Papuan peninsula.

Etymology. – Angulatus (Latin) means angular and refers to the angular claspers.

Papuapsaltria goniodes sp. n.
(figs. 5, 7-9, 11, 21-32)

Type material. – Holotype ♂: 'NEW GUINEA (NE) Mt. Otto, 2200 m, June 24, 1955' [print]; 'J.L. Gressitt collector' [print], BPBM. – Paratypes: PAPUA NEW GUINEA: Aiyura, nr Kainantu, 1700-2200 m, 6.i.1965, J.L. Gressitt, 1♂, ZMAN; Daulo Pass, 2400 m, 15.v.1963, J. Sedlacek, 1♂, BPBM; Daulo Pass, Asaro-Chiambu Div., 3000 m, 13.vi.1955, J.L. Gressitt, 1♂, BPBM; same data but 8500 ft, J.J.M. Scent-Ivany, 1♀, MVMA; Mt. Hagen, 1959, E. Reiner, 1♂, SMFD; Mt. Piora, 6°45' S 146°00' E, 2100 m, 12.vi.1966, G.A. Samuelson, 1♀, BPBM.

P. goniodes is slightly larger than *P. angulata*. These two species share a similar, almost triangularly elongate operculum but the male genitalia differ considerably. *P. goniodes* can be recognized by its variable tegmen venation and its deviating shape of the head, with the lateral ocelli somewhat wider apart than in other species of *Papuapsaltria*.

Description

Body light brown to dark reddish brown, unmarked. Females slightly smaller than males, but with more robust head and thorax, and longer tegmina. Tegmina of males 1.2-1.3× as long as body length, of females 1.4-1.5×. Male abdomen 1.5-1.9× as long as head and thorax, of females 1.2-1.3×.

Head (fig. 5): Reddish brown, without setae. Postclypeus much broader than in *P. angulata* and bluntly rounded, anterior margin weakly convex, almost continuous with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) straight or weakly concave (fig. 11). Distance between lateral ocelli distinctly longer (1.1-1.2) than distance between lateral ocellus and eye, and 2.0-2.6× the width of frontal ocellus.

Tegmina: Hyaline. Venation variable (fig. 21), often differing between left and right tegmen of individuals, with 9-12 apical areas and, rarely, a subapical area between ulnar and apical areas. Only 9-10 apical areas reach the ulnar or basal areas, others are formed by a more distal splitting of veins. Tegmen generally with a very broad hyaline costal area and a very broad hyaline border along hind margin.

Legs: Fore femur with three very short, about equally long, erect spines. Proximal spine finger-shaped and distinctly shorter than distance to middle spine (figs. 8-9).

Tymbal: Five parallel transverse sclerotized ridges spanning the tymbal from dorsal to ventral margin, a 6th ridge almost reaching ventral margin and a 7th, most proximal, ridge only partly separated from proximal tymbal margin, reaching to about half the tymbal width. Six short intercalary ridges clearly visible.

Opercula: Male operculum (fig. 29) not covering tymbal cavity in ventral view, leaving a wide gap between operculum and abdomen; folded membrane

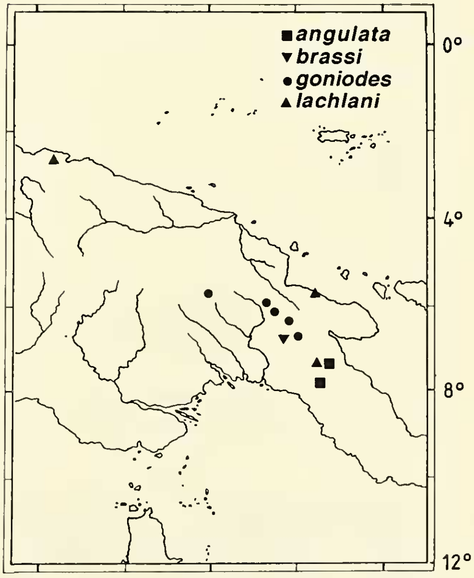


Fig. 32. Localities of *Papuapsaltria angulata*, *P. brassi*, *P. goniodes*, and *P. lachlani*.

clearly visible in ventral view. Distal part of operculum longer than basal part and medially elongate, almost triangle-shaped, as in *P. angulata*, but with lateral margin often bending more angularly from crest of basal part. Lateral margin convexly bent into almost straight distal margin. Distomedial corner of operculum almost rectangular, medial margin long and straight. Meracanthus slightly longer than operculum, but not reaching abdomen. Female operculum (fig. 31) much shorter than that of males. Distal part shorter than basal part, oblong. Distal margin straight, in one specimen slightly convex at half-length, distomedial corner rectangular, medial margin short and straight.

Abdomen: Male abdomen inflated. First tergite short, partly hidden under metanotum. Medial part of 2nd tergite less than 1.5× as long as lateral part. Anterior margin of 2nd tergite very weakly concave medially. First and 2nd sternite generally adjacent, but sometimes separated. Auditory capsules well developed, protruding and visible in dorsal view. Female abdomen slender. Female caudodorsal beak (fig. 30) slender and sharply pointed at apex. Ovipositor sheaths not reaching to apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 24. Dorsal margin weakly convex, continuous with short caudodorsal beak. Distal margin distinctly convex between caudodorsal beak and lateral protuberance, forming a weakly protruding lobe on pygofer (fig. 24 arrow). Caudodorsal beak fairly slender in lateral view, but broader at its base than in *P. angulata*, triangular with concave margins and pointed at apex (fig. 25). Lateral lobe of pygofer with narrow, rounded, and outcurving lobate protuberance. Pygofer forming a distinct rectangular and slightly incurving corner just below this protuberance (figs. 23-24). Ventral margin of pygofer angularly convex. Ventral half of pygofer opening horseshoe-shaped (fig. 22), with broad, rounded basal margin and concave lateral margins; in curving towards rectangular corners. Clasper (fig. 26) very broad and short, square-shaped in lateral view. Rectangular distodorsal corner of clasper bending mesiad, distally of aedeagus and supporting aedeagus in upright position. Distal margin of clasper straight, but slightly recurving to sharply pointed, downwards directed, thorn-shaped apex. Claspers slightly diverging towards apices. Clasper base forming a low ring-shaped collar around base of anal valves. This collar is medially indented around aedeagus, and less distinct than in foregoing species. Aedeagus standing erect between claspers, close to anal valves, but with apical part curving away, reaching well beyond distal margins of claspers. Aedeagus (fig. 28) weakly S-curved, most strongly curved and distinctly narrowing near apex, its most apical part almost rectangularly bent. Aedeagus with long and distinct lateral crests, a rounded middorsal ridge and a pair of weakly developed dorsal crests near apical bending point. Apex of aedeagus with slight medial incision (fig. 27).

Measurements: Body length ♂: 18.9-20.5 mm ($\bar{x}$ 19.9 mm), ♀: 17.8 & 18.0 mm; tegmen length ♂: 23.0-25.3 mm ($\bar{x}$ 24.0 mm), ♀: 26.0 & 27.1 mm; head length ♂: 1.2-1.5 mm, ♀: 1.5 mm; pronotum length ♂: 1.9-2.0 mm, ♀: 2.1 & 2.2 mm; mesonotum length ♂: 4.0-4.7 mm, ♀: 4.7 & 4.8 mm; head width ♂: 3.6-3.9 mm, ♀: 4.0 mm; width of pronotal collar ♂: 4.7-5.5 mm, ♀: 5.6 & 5.7 mm.

Distribution (fig. 32). – *P. goniodes* is distributed in central northern Papua New Guinea, just west of the Huon peninsula.

Etymology. – Goniodes (Greek) means angular and refers to the angular claspers.

Papuapsaltria lachlani sp. n.

(figs. 32-42)

Type material. – Holotype ♂: 'PAPUA NEW GUINEA Wau 28 Dec 1970 R.B. Lachlan' [print]; AMSA. – Paratypes: IRIAN JAYA: Ifar, Cyclops Mts., 400-800 m, 7-9.ix.1962, J. Sedlacek, 1♂, BPBM; PAPUA NEW GUINEA: Kiambavi vill., Saidor, Finisterre Range, 1-28.viii.1958. W.W. Brandt, 1♂, ZMAN; Wau, Big Wau Creek, 1200 m, Thomas W. Davies, 1♀, CAS; Wau, Morobe Distr., 20.x.1969, James E. Tobler, 1♀, CAS; Wau, Morobe Distr., Mt. Missim, 2080 m, 17.iii.1966, Gressitt, 1♂, BPBM.

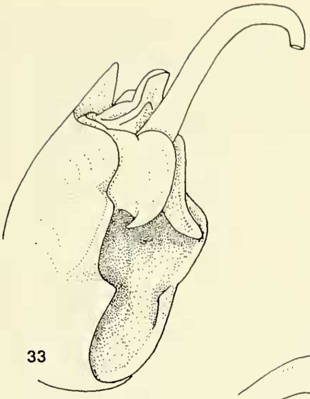
P. lachlani closely resembles *P. goniodes* in shape of male genitalia, but is distinctly smaller and has almost oblong-shaped opercula. Some specimens have an aberrant tegmen venation.

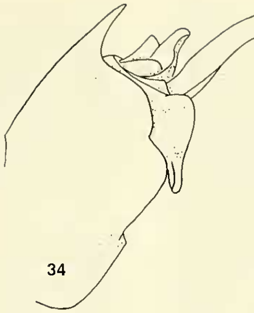
Description

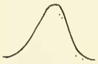
Body red-brown to greenish. Females slightly smal-

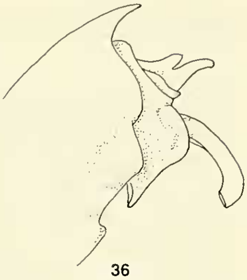
Figs. 33-42. *Papuapsaltria lachlani* sp. n. – 33, pygofer from aslant, holotype; 34, pygofer in lateral view, holotype; 35, male caudodorsal beak in dorsal view, holotype; 36, pygofer in lateral view, Ifar; 37, aedeagal apex, holotype; 38, claspers from behind, holotype; 39, male operculum, holotype; 40, female operculum, Big Wau Creek; 41, female caudodorsal beak in dorsal view, Big Wau Creek; 42, claspers, holotype.

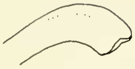
Figs. 43-52. *Papuapsaltria brassi* sp. n. – 43, pygofer from aslant, paratype; 44, male caudodorsal beak in dorsal view, holotype; 45, pygofer in lateral view, paratype; 46, claspers from behind, holotype; 47, claspers, holotype; 48, aedeagus in lateral view, paratype; 49, aedeagal apex, paratype; 50, male operculum, holotype; 51, female operculum, Purosa Camp; 52, female caudodorsal beak in dorsal view, Purosa Camp.

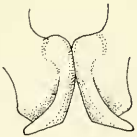

33

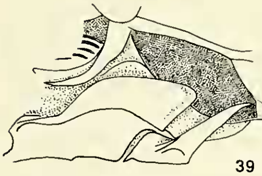

34

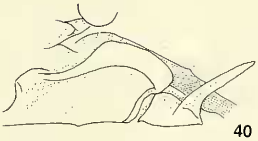

35

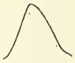

36

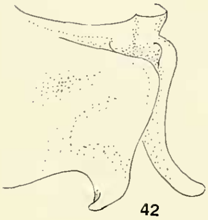

37

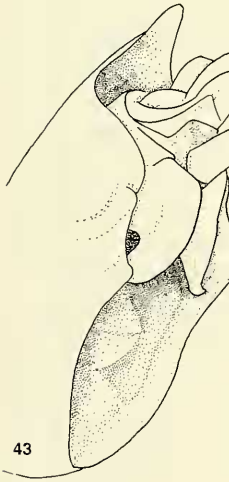

38

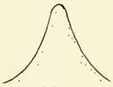

39

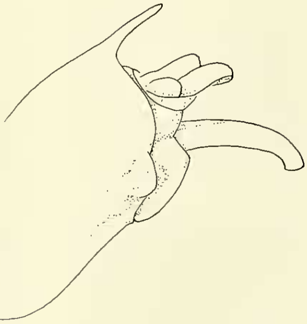

40

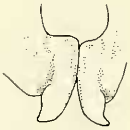

41

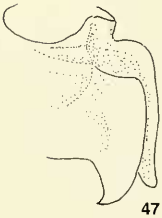

42

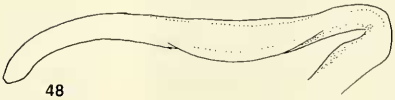

43

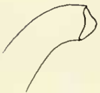

44

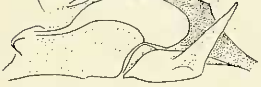

45

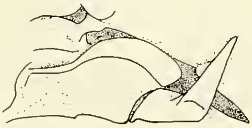

46

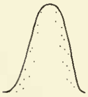

47


48


49


50


51


52

ler than males, but with more robust head and thorax. Tegmina of males 1.1-1.3× as long as body length, of females 1.3-1.4×. Male abdomen 1.4-1.7× as long as head and thorax, of females 0.9-1.2×.

Head: Reddish brown, often with some short red-brown setae on postclypeus and anterior parts of vertex. Diverging fissures on vertex fairly distinct in holotype, almost obsolete in paratypes. Postclypeus of holotype and females oblong and angularly protruding beyond vertex lobes, with almost straight anterior margin, angularly bending back at lateral corners and forming an almost right angle with anterior margins of vertex lobes. Postclypeus of other material with weakly convex anterior margin, almost continuous with anterior margins of vertex lobes. Postclypeus slightly swollen; anterior margin (lateral view) weakly convex. Distance between lateral ocelli in males as long as, in females slightly longer than distance between lateral ocellus and eye, and 2.0-2.3× the width of frontal ocellus.

Thorax: Pronotum with weak medial furrow.

Tegmina: Hyaline, venation sometimes variable, forming 8-10 long and slender apical areas and a very distinct hyaline costal area. Tegmen with a broad hyaline border along hind margin.

Legs: Fore femur with three very short, about equally long, erect spines. Proximal spine often extremely short and finger-shaped, though fairly long and pointed in specimen from Saidor, and always shorter than distance to middle spine.

Tymbal: Six parallel transverse sclerotized ridges spanning the tymbal from dorsal to ventral margin and a 7th, most proximal, ridge almost reaching ventral margin. Six short intercalary ridges can hardly be discerned.

Opercula: Male operculum (fig. 39) very short, not covering tymbal cavity in ventral view; leaving a wide gap between operculum and abdomen; folded membrane partly visible in ventral view. Distal part of operculum distinctly shorter than basal part and angular, almost oblong-shaped. Lateral margin almost straight, bending gradually into crest of basal part and angularly into long and straight distal margin. Distal margin forming a sharp angle with short and straight medial margin. Meracanthus reaching well beyond operculum, but not reaching abdomen. Female operculum (fig. 40) as in male, but shorter.

Abdomen: Male abdomen not inflated. First tergite short, partly, or completely, hidden under metanotum. Medial part of 2nd tergite less than 1.5× as long as lateral part. Anterior margin of 2nd tergite weakly convex medially. First and 2nd sternite not adjacent. Auditory capsules swollen and clearly visible in dorsal view. Female caudodorsal beak (fig. 41) triangular, almost pointed at apex. Ovipositor sheaths reaching just beyond apex of caudodorsal beak.

Male genitalia: Very similar to *P. goniodes*. Pygofer in lateral view as in fig. 34. Dorsal margin weakly convex, continuous with short and slender caudodorsal beak. Distal margin strongly convex between caudodorsal beak and lateral protuberance, forming an almost rectangular and incurving lobe. Caudodorsal beak in dorsal view broad, almost rectangularly protruding in Saidor specimen, but narrower and apically rounded in others (fig. 35). Lateral lobe of pygofer with distinct, angularly rounded, lobate, outcurving laminiform protuberance. Pygofer forming a distinct rectangular and slightly incurving corner just below this protuberance (fig. 33). Ventral margin of pygofer straight. Ventral half of pygofer opening horseshoe-shaped (cf. fig. 22), with broad, rounded basal margin and concave lateral margins; incurving towards rectangular corners. Claspers (fig. 42) as in *P. goniodes*, very broad and short, square-shaped in lateral view. Dorsal margin of clasper straight or weakly convex. Rectangular distodorsal corner of clasper bending mesiad, distally of aedeagus and supporting aedeagus in upright position. Distal margin of clasper straight, but slightly concave to sharply pointed, downwards directed, thorn-shaped apex. Claspers strongly diverging towards apices (fig. 38). Clasper base forming a low ring-shaped collar around base of anal valves. This collar medially indented around aedeagus. Aedeagus standing erect between claspers, close to anal valves, with its apical part curving away, reaching well beyond distal margins of claspers. Aedeagus of holotype very long, reaching far beyond apex of caudodorsal beak (fig. 34), in other specimens much shorter, curved directly above dorsal margins of claspers (fig. 36). Aedeagus weakly S-curved, angularly but slightly bent at about 3/4 its length (fig. 33) and strongly curved near apex, with short straight subapical part. Lateral crests long and distinct. Apex of aedeagus slightly dilated, with round pore (fig. 37).

Measurements: Body length ♂: 13.7-14.0 mm, ♀: 13.3 & 13.7 mm; tegmen length ♂: 16.6-20.1 mm, ♀: 18.2 & 18.4 mm; head length ♂: 1.3-1.4 mm, ♀: 1.4 mm; pronotum length ♂: 1.4-1.7 mm, ♀: 1.6 & 1.7 mm; mesonotum length ♂: 2.3-3.1 mm, ♀: 3.1 mm; head width ♂: 3.1-3.3 mm, ♀: 3.3 mm; width of pronotal collar ♂: 3.7-4.1 mm, ♀: 4.2 & 4.3 mm.

Distribution (fig. 32). – *P. lachlani* is widely distributed in northern New Guinea and the western part of the Papuan peninsula.

Etymology. – This species is named in honour of Mr R.B. Lachlan who collected the holotype.

Papuapsaltria brassi sp. n.
(figs. 32, 43-52)

Type material. – Holotype ♂: 'No 10, Purosa

Camp, Okapa area, 1950 m, ix-25-1959' [print]; 'Eastern Highlands District L.J. Brass coll' [print]; 'sixth Archbold Exped. to Papua New Guinea' [print]; 'AMNH New York' [print], AMNH. – Paratypes: PAPUA NEW GUINEA: same data as holotype but 29.ix.1959, 1♂, 1♀, AMNH; Okapa, 13 km SE, 1650-1870 m, 26.-viii.1964, J. & M. Sedlacek, 1♂, BPBM; Okapa, 1900 m, 3.vi.1967, G.A. Samuelson, 1♀, BPBM.

P. brassi strongly resembles *P. lachlani*, but is slightly larger and has slightly shorter and less strongly diverging claspers. *P. brassi* is most easily separated from *P. lachlani* by a more oval-shaped male operculum, a narrower gap between operculum and abdomen and smaller protrusions on the lateral lobes of pygofer.

Description

Body yellow-brown or olive green. Females larger than males. Tegmina of males 1.3× as long as body length, of females 1.4×. Male abdomen 1.4-1.6× as long as head and thorax, of females 1.2-1.3×.

Head: Reddish brown, with some short red-brown setae on postclypeus and vertex. Postclypeus hardly protruding, anterior margin weakly convex, almost continuous with anterior margins of vertex lobes, and not swollen; anterior margin (lateral view) weakly concave. Distance between lateral ocelli 1.0-1.2× as long as distance between lateral ocellus and eye and 1.9-2.3× the width of frontal ocellus.

Legs: Fore femur with row of three erect spines. Most proximal spine very short, hardly longer than middle spine and much shorter than distance to middle spine.

Tegmina: Hyaline, with 8 apical areas, a narrow but distinct costal area and a fairly narrow hyaline border along hind margin.

Tymbal: Six parallel transverse sclerotized ridges spanning the tymbal from dorsal to ventral margin and a 7th, most proximal, ridge almost reaching ventral margin. Six short intercalary ridges can hardly be discerned.

Opercula: Male operculum (fig. 50) very short, not covering tymbal cavity in ventral view, but leaving only a narrow gap between operculum and abdomen; folded membrane not visible in ventral view. Distal part of operculum distinctly shorter than basal part and oval-shaped. Lateral margin very short, bending gradually into crest of basal part and convexly curving into long and weakly convex distal margin. Distomedial corner broadly rounded, medial margin weakly convex. Meracanthus reaching well beyond operculum and beyond anterior margin of abdominal segment 2. Female operculum (fig. 51) much shorter than that of males. Distal part much shorter than basal part, nearly oblong, with weakly convex distal margin. Distolateral corner rounded, distomedial corner almost rectangular. Medial margin short and straight.

Abdomen: Male abdomen not inflated. First tergite short, either partly, or completely, hidden under metanotum. Medial part of 2nd tergite hardly longer than lateral parts. Anterior margin of 2nd tergite weakly convex medially. First and 2nd sternite not adjacent. Auditory capsules swollen and clearly visible in dorsal view. Female abdomen of same shape as in male. Female caudodorsal beak in dorsal view (fig. 52) slender triangular, narrowly rounded at apex. Ovipositor sheaths just reaching beyond apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view (fig. 45) closely resembling that of *P. lachlani*. Caudodorsal beak very slender and straight, dorsally not continuously rounded with convex dorsal margin of pygofer. Distal margin of pygofer strongly convex between caudodorsal beak and lateral protuberance, forming a fairly distinct inwards curving lobe. Caudodorsal beak narrowly triangular with concave margins, and apically rounded (fig. 44). Lateral lobe of pygofer with distinct, narrowly rounded lobate outcurving protuberance. Pygofer forming a rectangular and slightly incurving corner just below this protuberance, which is smaller than in *P. lachlani* and hardly visible in lateral view (figs. 43, 45). Ventral margin of pygofer straight. Ventral half of pygofer opening horseshoe-shaped (cf. fig. 22), with broad, rounded basal margin and concave lateral margins; incurving towards rectangular corners. Claspers (fig. 47) as in *P. lachlani*, but reaching less far beyond pygofer margin. Dorsal margin of clasper straight. Rectangular distodorsal corner of clasper bending mesiad, distally of aedeagus and supporting aedeagus in upright position. Distal margin of clasper weakly convex towards thorn-shaped apex. Claspers weakly diverging towards apices (fig. 46). Clasper base forming a very distinct ring-shaped collar around base of anal valves. This collar is medially indented around aedeagus. Aedeagus standing erect between claspers, close to anal valves, but with apical part curving away, reaching well beyond distal margins of claspers. Aedeagus (fig. 48) weakly S-curved, with short, but distinct, lateral crests restricted to its proximal half, and a distinct and slender dorsal crest. Aedeagal pore almost round (fig. 49).

Measurements: Body length ♂: 14.6-15.5 mm, ♀: 15.6 & 16.1 mm; tegmen length ♂: 19.1-19.6 mm, ♀: 22.3 & 22.4 mm; head length ♂: 1.1-1.2 mm, ♀: 1.3 mm; pronotum length ♂: 1.6 mm, ♀: 1.8 mm; mesonotum length ♂: 3.1-3.5 mm, ♀: 3.5 & 4.2 mm; head width ♂: 3.1-3.2 mm, ♀: 3.3 & 3.4 mm; width of pronotal collar ♂: 3.9-4.3 mm, ♀: 4.2 & 4.9 mm.

Distribution (fig. 32). – All specimens come from Okapa, in the Eastern Highlands of Papua New Guinea.

Etomology. – This species is named in honour of Mr L.J. Brass who collected the holotype, and many other specimens on which the current revision of the '*Baeturia* and related genera complex' is based.

Papuapsaltria stoliodes sp. n.

(figs. 3, 53-64)

Type material. – Holotype ♂: 'NEW GUINEA: PAPUA / Owen Stanley Range / Goilala: Bome, 1950 m / iv.16-30.1958' [print]; 'W.W. Brandt / Collector / BISHOP' [print], BPBM. – Paratype: PAPUA NEW GUINEA: Wau, 1100-1300 m, 2.i.1966, L. & M. Sedlacek, 1♂, BPBM.

Other material: PAPUA NEW GUINEA: Mt. Kaindi, 30.iv.1962. J.L. Gressitt, 1♀, BPBM; Edi Creek, 2000 m, 31.v.1962, J. Sedlacek, 1♂, BPBM; Mt Missim, 2100 m, 21.iii.1968, J.H. Sedlacek, 1♀, BPBM; Wau, 9-12.i.1962, J., J.H., & M. Sedlacek, G. Monteith & native collectors, 1♀, BPBM.

Males of *P. stoliodes* are easily recognized by the folded pygofer and the long and slender clasper, with a thorn-shaped lateral protuberance. Three females from the same area presumably belong to this species but are not included in the type series.

Description

Body light brown. Females smaller than males, but with more robust head and thorax, and longer tegmina. Tegmina of males 1.2-1.3× as long as body length, of female 1.6×. Male abdomen 1.5-1.9× as long as head and thorax, of females 1.1-1.3×.

Head: Postclypeus angularly protruding, smoothly rounded anteriorly, its anterior margin weakly convex, almost continuous with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) concave (fig. 53). Distance between lateral ocelli 0.8-0.9× as long as distance between lateral ocellus and eye and 1.5-2.2× the width of frontal ocellus.

Legs: Fore femur (fig. 57) with row of three erect spines. Most proximal spine very short, hardly longer than middle spine and much shorter than distance to middle spine.

Tegmina: Hyaline, venation in holotype with 11-12, in other material with 8, long and slender apical areas. Tegmen with a distinct costal area and a broad hyaline border along hind margin.

Tymbals: Six slightly sclerotized parallel ridges spanning the tymbal from dorsal to ventral margin, and a 7th, most proximal, ridge spanning only about 3/4 of tymbal width. Lateral band of seven intercalary ridges weakly developed.

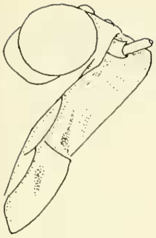
Opercula: Male operculum (fig. 59) quite large, covering greater part of tymbal cavity; folded membrane not visible in ventral view. Distal part of operculum angularly oval-shaped, medially distinctly reaching beyond meracanthus. Lateral margin short and straight, angularly bending into long and angularly convex distal margin and angularly bending into crest of basal part. Medial margin angularly bent at half-length. Meracanthus reaching beyond operculum, and just beyond anterior margin of abdominal segment 2. Distal part of female operculum (fig. 63) shorter than basal part and angularly rounded, sickle-shaped.

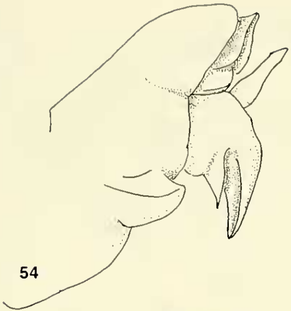
Abdomen: Male abdomen distinctly inflated. First tergite very short and medially hidden under metanotum. Medial part of 2nd tergite fairly long, about twice as long as lateral parts. Anterior margin of 2nd tergite weakly concave medially. Auditory capsules distinctly swollen. First and 2nd sternites adjacent. Female caudodorsal beak in dorsal view (fig. 64) broad, triangular, and bluntly rounded at apex. Ovipositor sheaths reaching just beyond apex of caudodorsal beak.

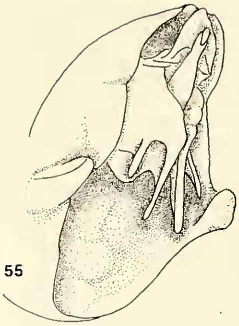
Male genitalia: Pygofer in lateral view (fig. 54) with sharp fold at base of caudodorsal beak. Dorsal margin of pygofer convex, though weakly concave towards proximal end, and continuously curved with broad and stout caudodorsal beak. Distal margin forming an obtuse angle with margin of beak, and an angularly rounded, inwardly curved lobe just above lateral protuberance. Ventral margin straight, but angularly bent near lateral protuberance, though not forming a distinct or protruding corner (figs. 54-55). Ventral margins weakly converging to base of pygofer; basal part of pygofer opening broad, U-shaped. Caudodorsal beak in dorsal view (fig. 58) very broad and stout, bicuspidate; medially incised at distal margin. Lateral lobe of pygofer strongly curving inwards towards end of distal margin, forming a short, dorsoventrally flattened, and distinctly posteriorly project-

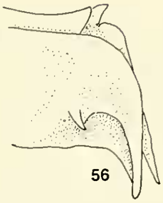
Figs. 53-64. *Papuapsaltria stoliodes* sp. n. – 53, postclypeus in lateral view, holotype; 54, pygofer in lateral view, holotype; 55, pygofer from aslant, holotype; 56, claspers, holotype; 57, male fore femur, Wau; 58, male caudodorsal beak in dorsal view, holotype; 59, male operculum, holotype; 60, aedeagus in dorsal view, holotype; 61, aedeagal apex in lateral view, holotype; 62, aedeagus in lateral view, holotype; 63, female operculum, Wau; 64, female caudodorsal beak in dorsal view, Wau.

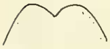
Figs. 66-75. *Papuapsaltria plicata* sp. n. – 66, pygofer from aslant, Mt. Missim; 67, pygofer in lateral view, Mt. Missim; 68, male first and second tergites in dorsal view, Mt. Missim; 69, male caudodorsal beak in dorsal view, Mt. Missim; 70, aedeagal apex, Bulldog Road; 71, aedeagus in lateral view, Bulldog Road; 72, claspers, Mt. Missim; 73, male operculum, Mt. Missim; 74, female operculum, Mt. Missim; 75, female caudodorsal beak in dorsal view, Mt. Missim.

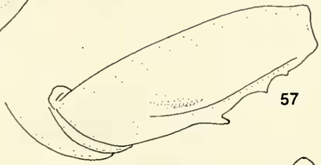

53

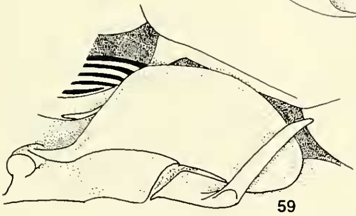

54

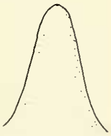

55

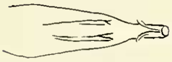

56

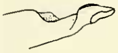

58

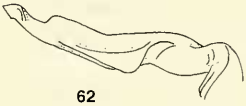

57

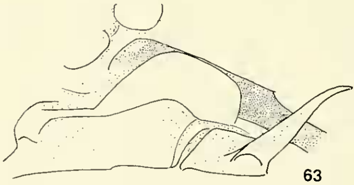

59

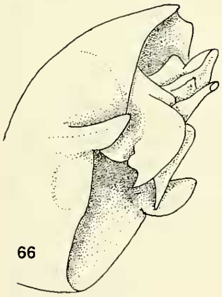

64

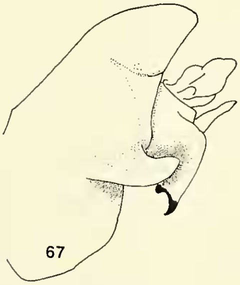

60

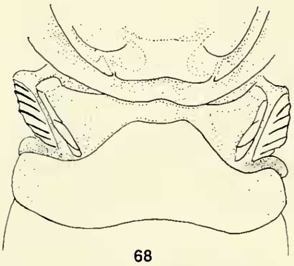

61

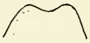

62

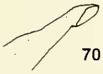

63

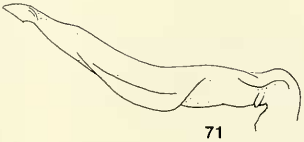

66

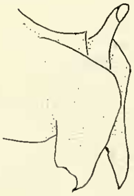

67

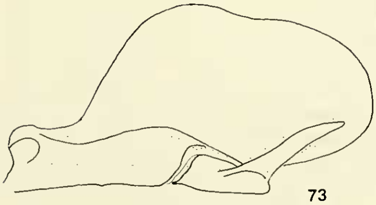

68

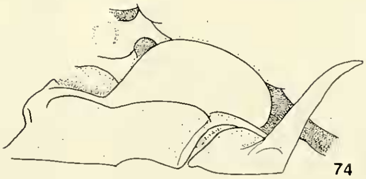

69

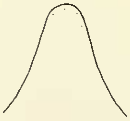

70


71


72


73


74


75

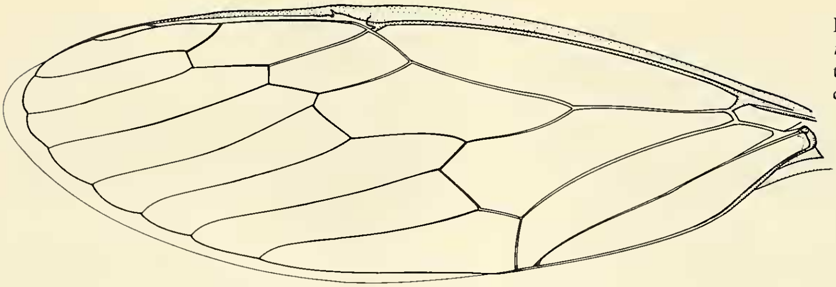


Fig. 65. *Papuapsaltria plicata* sp. n. Left tegmen, male Bulldog Road.

ing protuberance. Claspers (fig. 56) very slender, laminiform and slightly diverging towards apices. Dorsal margin straight, curving down at rounded distodorsal corner. Clasper slightly bending inwards distally of aedeagus. Apical part very long and slender, with almost membranous and transparent medial part, arching between apex and base of clasper. Clasper forming a short, sharply pointed thorn-shaped lateral protrusion at its base, in paratype distinctly longer than in holotype. Aedeagus (fig. 62) short and almost straight, most strongly curved near apex. Lateral crests broadening, almost angularly amplified, towards proximal ends and curving upwards at distal ends, fusing to a small ridge at apical bending point of aedeagus. Pair of distinct dorsal ridges (fig. 60) abruptly ending at angularly protruding distal corners. Aedeagal pore almost round (fig. 61).

Remark: The male from Edi Creek lacks the greater part of its abdomen.

Measurements: Body length ♂: 18.6 & 19.1 mm, ♀: 17.6-18.7 mm; tegmen length ♂: 20.0-25.0 mm, ♀: 28.8 mm; head length ♂: 1.2-1.3 mm, ♀: 1.5-1.6 mm; pronotum length ♂: 1.8-2.0 mm, ♀: 2.0-2.4 mm; mesonotum length ♂: 3.8-4.1 mm, ♀: 4.6-5.0 mm; head width ♂: 3.1-3.4 mm, ♀: 3.7-3.9 mm; width of pronotal collar ♂: 5.0-5.2 mm, ♀: 5.7-5.8 mm.

Distribution (fig. 3). – *P. stoliodes* is endemic to the central western part of the Papuan peninsula.

Etymology. – Stoliodes (Greek) means folded and refers to the peculiarly folded pygofer.

Papuapsaltria plicata sp. n.
(figs. 3, 65-75)

Type material. – Holotype ♂: ' NEW GUINEA (NE) / Mt. Kaindi, 16 km / SW of Wau, 2200 m / 8-9.vi.1962' [print]; 'Light Trap / J. Sedlacek / BISHOP' [print], BPBM. – Paratypes: PAPUA NEW GUINEA: same data as holotype 1♂, BPBM; Bulldog Rd., c 14 km S. Edie Creek, 2450 m, 4-10.vii.1966, G.A. Samuelson, 1♂, BPBM; Mt. Kaindi, 2400 m, 27.i.1963, J. Sedlacek, 1♂, BPBM; Mt. Kaindi, 2350 m, 26.v.1967, J.L. Gressitt, 1♂, BPBM; Mt. Kaindi, 9.vi.1962, J. & M. Sedlacek, 1♀, BPBM; Mt. Missim, 2400-2800 m, 22-30.v.1968, J.L. Gressitt, R.C.A. Rice & J. Sedlacek, 1♂, BPBM; Mt. Missim, 2400 m, 21.iv.1968, J. & M. Sedlacek, 1♂, ZMAN; Mt. Missim, Morobe Prov., 2400 m, 23.iv.1968, J. Sedlacek, 1♂, BPBM; same data 1♂, ZMAN; Mt. Missim, Wau, Morobe Distr., 1200-1800 m, 8.xii.1963, H. Clissold, 1♀, ZMAN; Mt Strong, 2600-3000 m, 8-10.i.1968, J. & M. Sedlacek, 1 ♂, BPBM.

P. plicata closely resembles *P. stoliodes*, sharing a very similarly folded pygofer, but is distinctly larger. Males have a larger operculum and a shorter, bicuspidate, clasper.

Description

Body light brown. Females smaller than males, but with more robust head and thorax, and longer tegmina. Tegmina of males 1.2-1.3× as long as body length, of females 1.6×. Male abdomen 1.7-2.2× as long as head and thorax, of females 1.1-1.3×.

Head: Postclypeus fairly narrow, angularly protruding, anterior margin weakly convex, almost continuous with anterior margins of vertex lobes. Postclypeus weakly swollen; anterior margin (lateral view) almost straight. Ocelli large and fairly close together; distance between lateral ocelli 0.6-0.9× as long as distance between lateral ocellus and eye and 1.2-2.0× the width of frontal ocellus.

Legs: Fore femur with row of three erect spines. Most proximal spine very short, though longer than middle spine, much shorter than distance to middle spine.

Tegmina: Hyaline, venation variable, generally with 8, but sometimes with 9-10 long and slender apical areas (fig. 65); additional areas often caused by splitting of the 8th apical area. Tegmen with distinct costal area and fairly broad hyaline border along hind margin.

Tymbals: Six slightly sclerotized parallel ridges spanning the tymbal from dorsal to ventral margin, and a 7th, most proximal, ridge spanning only about 3/4 of tymbal width. Lateral band of seven intercalary ridges weakly developed.

Opercula: Male operculum (fig. 73) larger than in *P. stoliodes*, almost completely covering tymbal cavity; folded membrane not visible in ventral view. Distal part of operculum angular and oblong, medially distinctly reaching beyond meracanthus. Lateral margin long and straight, forming a distinct and obtuse angle with crest of basal part and with distal margin. Distal margin long and straight, sometimes weakly concave at about half-length. Medial margin angularly convex. Meracanthus not reaching distal margin of operculum. Distal part of female operculum (fig. 74) about as long as basal part and oblong-shaped, with convex distal margin and rounded corners.

Abdomen: Male abdomen distinctly inflated. Medial part of 2nd tergite fairly long, about twice as long as lateral parts (fig. 68). Anterior margin of 2nd tergite weakly concave medially. First and second sternites adjacent. Auditory capsules weakly inflated. Female caudodorsal beak in dorsal view (fig. 75) narrow triangular and bluntly rounded at apex. Ovipositor sheaths not reaching beyond apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view (fig. 67) with sharp fold at base of caudodorsal beak. Dorsal margin almost straight, convexly bent into stout caudodorsal beak. Distal margin making an obtuse angle with margin of beak, and forming an angularly rounded, inwardly curved lobe just above lateral protuberance. Ventral margin angularly bent at half-length. Pygofer from behind with almost parallel ventral margins; basal part of pygofer opening broad, U-shaped (fig. 66). Caudodorsal beak in dorsal view (fig. 69) very broad and stout, bicuspidate; medially incised at distal margin. Lateral lobe of pygofer strongly curving inwards towards end of distal margin, forming a long and slender, dorsoventrally flattened and upwards curving, but distinctly posteriorly projecting, almost laminiform protuberance. Claspers (fig. 72) very slender, almost laminiform, slightly diverging towards apices. Dorsal margin straight, curving down at rounded distodorsal corner and slightly bending inwards distally of aedeagus. Apical part shorter and broader than in *P. stoliodes*, and bicuspidate; ending in two, often darkly sclerotized, small thorns. Aedeagus (fig. 71) angularly upcurved at half-length, but weakly recurving near apex. Lateral crests slightly broadening towards proximal ends. A small, weakly developed collar at apical bending point of aedeagus, not clearly connected to lateral crests. Distinct dorsal ridge, abruptly ending in angularly protruding distal corner. Aedeagal pore oval (fig. 70).

Measurements: Body length ♂: 20.0-22.5 mm ($\bar{x}$ 21.2 mm), ♀: 16.4-19.1 mm; tegmen length ♂: 24.3-29.3 mm ($\bar{x}$ 26.0 mm), ♀: 28.8-30.8 mm; head length ♂: 1.3-1.5 mm, ♀: 1.5-1.6 mm; pronotum length ♂: 1.9-2.2 mm, ♀: 2.0-2.5 mm; mesonotum length ♂: 3.7-4.7 mm, ♀: 4.8-5.2 mm; head width ♂: 3.3-3.7 mm, ♀: 3.7-4.1 mm; width of pronotal collar ♂: 5.0-6.0 mm, ♀: 5.8-6.2 mm.

Distribution (fig. 3). – This species appears restricted to the western part of the Papuan peninsula, all specimens were collected in the viscinity of the town of Wau.

Etymology. – Plicata (Latin) means folded and refers to the peculiarly folded pygofer.

Papuapsaltria ungula sp. n.

(figs. 3, 76-82)

Type material. – Holotype ♂: 'NEW GUINEA: PAPUA Kokoda-Pitoki 450 m, iii-24-1956' [print]; 'J. L. Gressitt Collector' [print], BPBM. – Paratype: PAPUA NEW GUINEA: British New Guinea, 1921, R. Neil (Rothschild Bequest BM 1939 1), ♂, BMNH.

Only two males are available of this species. *P. ungula* is presumably closely related to *P. stoliodes*, as is suggested by the shared transparent medial part of the clasper. The species can be recognized by its claw-shaped clasper, with a very long and spiny apical part and a sharp lateral protrusion. *P. ungula* can further be recognized by its long and curved caudodorsal beak.

Description

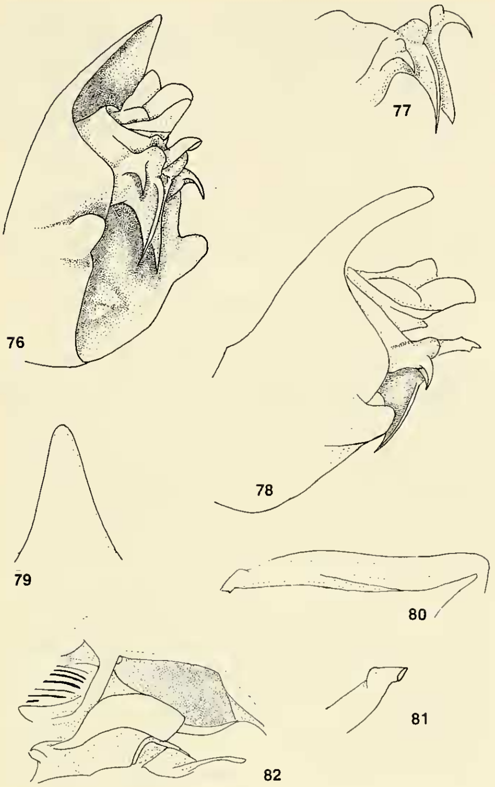
Body greenish brown. Tegmina 1.1× as long as body length. Abdomen 1.5-1.6× as long as head and thorax.

Head: Vertex and postclypeus with short red-brown setae. Postclypeus angularly protruding, anterior margin almost continuous with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) concave. Ocelli large and fairly close together. Distance between lateral ocelli 0.7-0.8× as long as distance between lateral ocellus and eye and 1.4-1.7× the width of frontal ocellus.

Legs: Fore femur with row of three erect spines. Most proximal spine fairly short, hardly longer than middle spine and much shorter than distance to middle spine.

Tegmina: Hyaline, with 8 apical areas, a narrow but distinct costal area and a fairly narrow hyaline border along hind margin.

Tymbals: Seven slightly sclerotized parallel ridges spanning the tymbal from dorsal to ventral margin, and an 8th, most proximal, ridge spanning only about 3/4 of tymbal width. Lateral band of seven intercalary ridges weakly developed.



Figs. 76-82. *Papuapsaltria ungula* sp. n., holotype: 76, pygofer from aslant; 77, claspers; 78, pygofer in lateral view; 79, caudodorsal beak in dorsal view; 80, aedeagus in lateral view; 81, aedeagal apex; 82, operculum.

Operculum (fig. 82): Very small, not covering tymbal cavity; folded membrane hardly visible in ventral view. Distal part of operculum shorter than basal part, angularly oblong, and erect, not reaching medially of meracanthus. Lateral margin short and straight, concavely curving into crest of basal part and forming an obtuse angle with long and straight distal margin. Medial margin straight, distomedial corner almost rectangular. Meracanthus just reaching anterior margin of abdomen.

Abdomen: Not inflated. First tergite short, not hidden under metanotum. Medial part of 2nd tergite only slightly longer than lateral parts. Anterior margin of 2nd tergite convex dorsally, but weakly concave medially. First and 2nd sternites almost adjacent. Auditory capsules strongly inflated.

Genitalia: Pygofer in lateral view as in fig. 78. Dorsal margin straight at base, but broadly convex, continuous with long and slender, convexly bent caudodorsal beak. Distal margin angularly convex, forming a distinct and angular distal lobe on pygofer, and forming an almost right angle with weakly concave margin of beak. Ventral margin almost straight. Ventral margins weakly converging towards base of pygofer; basal part of pygofer opening broad, V-shaped (fig. 76). Caudodorsal beak in dorsal view (fig. 79) long, triangular, and rounded at apex. Lateral lobe of pygofer weakly curving inwards towards end of distal margin, forming a short and conically shaped, dorsoventrally flattened, and distinctly posteriorly projecting protuberance. Claspers (fig. 77) distinctly bifurcate, claw-shaped, and slightly diverging towards apices. Dorsal part of clasper forming a globularly rounded protuberance adjacent to aedeagus and supporting aedeagus in upright position. Apical part of clasper very long and slender, strongly curved down and sharply pointed. Medial part of clasper membranous as in *P. stoliodes* and *P. nana*, and almost transparent between apex and base. Clasper forming a short, thorn-shaped, sharply pointed and downwards curving lateral protuberance at the base of its globular dorsal protuberance. This lateral protuberance shorter than the apical part of clasper. Aedeagus (fig. 80) shorter than in most foregoing species, just reaching beyond clasper, and angularly upcurved at half-length, but weakly recurving near apex. Lateral crests very slender, slightly broadening towards their proximal ends and upcurving at their distal ends. Crests fused to a small collar around apical bending point of aedeagus (fig. 81), though connection between collar and crests very vague. Aedeagus with rounded dorsal ridge and distinct ventral crest. Aedeagal pore oval-shaped.

Measurements: Body length: 13.2 & 14.8 mm; tegmen length: 15.0 & 16.8 mm; head length: 1.0 & 1.1 mm; pronotum length: 1.5 mm; mesonotum length: 2.7 & 2.9 mm; head width: 2.8 & 2.9 mm; width of pronotal collar: 3.5 & 3.7 mm.

Distribution (fig. 3). – *P. ungula* is probably endemic to the Papuan peninsula.

Etymology. – The name ungula (Latin claw) refers to the claw-shaped clasper.

Papuapsaltria nana (Jacobi, 1903) n. comb. (figs. 3, 6, 83-91)

Baeturia beccarii. – Distant 1892: Tab xiv figs. 27, 27a-b only (non Distant, 1888).

Acrilla nana Jacobi, 1903: 13, fig. 5.

Baeturia famulus Distant, 1906: 157. – Kato 1931: 74; Kato 1932: 184; Blöte 1958: 266; Metcalf 1963: 245-250; Duffels & Van der Laan 1985: 252; De Boer 1986: 176; De Boer 1993a: 16. (**syn. n.**).

Thaumastopsaltria nana. – Distant 1906: 160; Metcalf 1963: 259; De Boer 1992b: 17-18.

The following references to *famulus* refer to other species: *Baeturia famulus* Stål MS; Distant 1892: 149 in synonymy of *Baeturia beccarii* is *Muda virguncula*, *Baeturia famulus*; Myers 1928: fig. 18 is *Aedeastria latifrons* (Blöte, 1960), and *Baeturia famulus*; Lallemand 1931: 78, the specimen indicated is a female belonging to *Baeturia macgillavryi* De Boer, 1989.

Lectotype designation. – The type series of *Acrilla nana* comes from Milne Bay, but the number of type specimens is not known (Jacobi 1903). In the Dresden museum I found 3♂ and 5♀ from Milne Bay from the collection of A. Jacobi; 1♂ and 1♀ are labelled 'typus' and one ♀ 'cotypus'. One male in the BMNH from the same locality and from the Distant collection, is also labelled 'typus'. All these specimens belong to the same species. The male with the 'typus' label from the Dresden collection is hereby designated lectotype, the other specimens with typus/cotypus labels are regarded as paralectotypes, but the remaining 2♂ and 3♀ should possibly also be regarded as paralectotypes.

Nomenclature and synonymy. – *Baeturia famulus* is a manuscript name of Stål which was regarded as a synonym of *Baeturia beccarii* Distant, 1888, when it was mentioned in Distant's 'Monograph of Oriental Cicadidae' (1892). Some years later *Baeturia beccarii* was transferred to the genus *Muda* Distant, 1897 (Distant 1906), and brought into the synonymy of *Muda virguncula* (Walker, 1857) by Moulton (1923). Distant's type of *Baeturia beccarii* in the BMNH certainly belongs to the genus *Muda*. The specimen depicted by Distant (1892) as *Baeturia beccarii* (table xiv figs 27, 27 a-b) is not a *Muda* however. Distant realized this and in his 'Synonymic Catalogue of Homoptera' (1906) he presents *Baeturia famulus* separately from *Muda beccarii*. Distant does not give a description of *B. famulus*, he merely refers to Stål MS and *Baeturia beccarii* (fig only) in his monograph of 1892.

From that moment the name *Baeturia famulus* Distant became valid, with as its description the figure published in 1892 and the depicted specimen as its holotype, *B. famulus* Stål never having been published than as a junior synonym (see Int. code art. 11 e). This depicted specimen was identified by Blöte as one from Bujakori, S New Guinea, and is now in the BMNH. Though the specimen does not bear any identification labels of Distant, it can be recognized by the 9 apical areas in its left tegmen. As Blöte realized, this specimen could not be the one indicated as *famulus* Stål MS, since it was collected in 1890 and Stål died in 1878. Apart from some doubt it sheds on the correctness of Blöte's identification of the Bujakori specimen as the one depicted in 1892, this is of no further consequence.

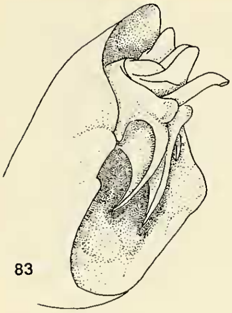
I here follow Blöte and regard the Bujakori specimen as the holotype of *Baeturia famulus* Distant, 1906. Comparison of types revealed that *B. famulus* Dist. is a junior synonym of *Thaumastopsaltria nana* (Jacobi, 1903), originally described as *Acrilla nana*.

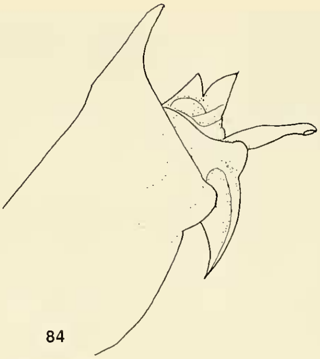
Both Metcalf (1963) and Duffels & Van der Laan (1985) incorrectly regarded Myers as the author of *B. famulus*, originating from an incorrect interpretation of Distant, 1906. Metcalf falsely stated that Distant (1906) regarded *B. famulus* to be a synonym of *Baeturia beccarii*.

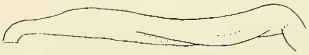
Myers (1928) mentioned 'an undoubtedly distinct species *B. famulus* Dist.' and depicted its aedeagus. Depicted however, is not the holotype of *B. famulus* Distant, but a specimen of an altogether different species. This specimen could be traced in the BMNH and is labeled 'Aru; Wallace; 67/66' and has on a separate pin, labeled '*famulus*' in pencil in Myers' hand, a preparation of part of its abdomen and pygofer glued on yellow mika. Though these parts are heavily crushed, the aedeagus is in good condition and matches Myers' drawing. The specimen belongs to *Aedeastria latifrons* (Blöte, 1960) which will remain its valid name, the name *B. famulus* Myers being a homonym.

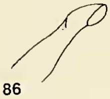
Material examined. – Neu Guinea, Staudinger, 1♀ det. *Acrilla nana*, SMFD; PAPUA NEW GUINEA: Bujakori, viii.1890, L. Loria, 1♂ det. *beccarii*, 3♂, 1♀, MCSN; same data 1♂ holotype *Baeturia famulus* Distant, 2♀, BMNH; Finschhafen, 250 ft, 9.ix.1944, H. Hoogstraal, 2♂, NCSU; Menapi, Cape Vogel peninsula, 0-30 m, 25.iv.1953, G.H.H. Tate, 1♂, AMNH; same data but Geoffrey M. Tate, 2♂, AMNH; Milne Bay, ♂ typus *Acrilla nana* paralectotype, BMNH; Milne Bay, Coll. A. Jacobi 1911-5, 1♂ Typus *Acrilla nana* lectotype, 1♀ typus *Acrilla nana* paralectotype, 1♀ cotypus *Acrilla nana* paralectotype, SMTD; Milne Bay, 2♂, 3♀, (paralectotypes?) SMTD; Milne Bay, 1♀, ZILS; Peria Creek, Kwagira riv., 50 m, 14.viii-6.ix.1953, Geoffrey M. Tate, 5♂, 1♀, AMNH; same data 1♂, ZMAN; Popondetta, 25 m, v.1966, Shanahan-Lippert, 8♂, 1♀, BPBM; same data but vi.1966, 5♂, 3♀, BPBM; same data 2♂, 1♀, ZMAN; Popondetta, 60 m, 1-4.ix.1963, J. Sedlacek, 9♂, 3♀, BPBM; same data 2♂, 1♀, ZMAN; Popondetta, Buka-Bara, 23.ix.1963, P. Shanahan, 1♂, BPBM; Pt. Glasgow, Mamai Plnt., 150 m, 6.ii.1965, R. Straatman, 1♂, BPBM; without locality label: Sayer, 1♂, 1♀ det. *famulus* MS Stål, 1♀, BMNH: D'ENTRECASTEAUX ISLANDS: Normanby I., Wakaiuna, Sewa Bay, 15-30.x.1956, W.W. Brandt, 1♂, BPBM; same data but 21-30.xi.1956, 1♀; 11-20.xii.1956, 1♀, both BPBM.

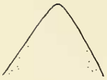
P. nana lacks the distinctly convex distal margin of the pygofer, shared by many of the foregoing species. The clasper of *P. nana*, however, strongly suggests a close relationship with *P. ungula*. The claspers of these species share a similar apex and a similarly transparent medial part. However, the clasper of *P. nana* has a larger dorsal protrusion and a much smaller lat-

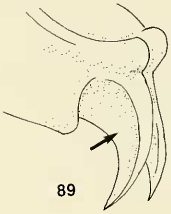

83

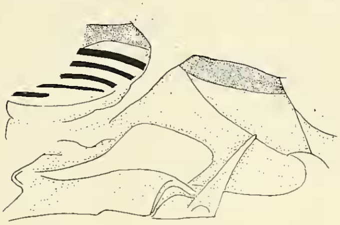

84

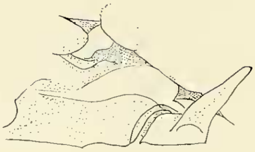

85

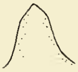

86

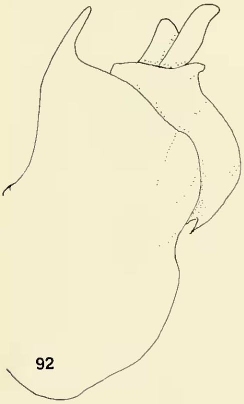

88

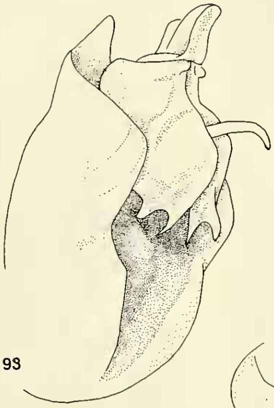

89

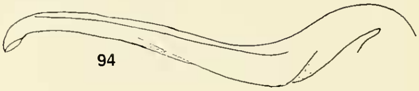

87

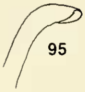

90

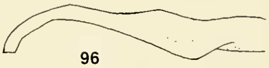

91

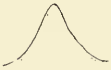

92

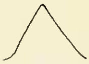

93

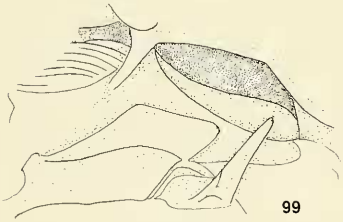

94

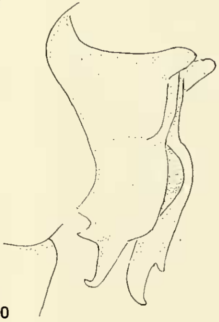

95

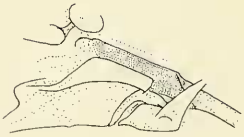

96


97


98


99


100


101

eral protrusion, the latter forming a bluntly rounded lobe.

Description

Body yellowish brown or olive green. Females smaller than males, but with more robust head and thorax and longer tegmina. Tegmina of males 1.0-1.2× as long as body length, of females 1.2-1.3×. Male abdomen 1.4-1.8× as long as head and thorax, of females 1.1-1.4×.

Head (fig. 6): Vertex and postclypeus practically bald. Postclypeus broad and sharply edged, distinctly protruding beyond vertex lobes, forming an obtuse angle anteriorly. Anterior margin of postclypeus sharply curving back at lateral corners, forming almost right angles with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) concave. Vertex with weak furrows between ocelli. Distance between lateral ocelli fairly variable, 0.9-1.3× as long as distance between lateral ocellus and eye and 1.6-3.2× the width of frontal ocellus.

Thorax: Pronotum often with distinct medial furrow.

Legs: Fore femur with row of three erect spines. Most proximal spine generally distinctly longer than middle spine, but much shorter than distance to middle spine.

Tegmina: Generally with 8, occasionally with 9-10, apical areas, a distinct costal area and a broad hyaline border along hind margin.

Tymbals: Four slightly sclerotized parallel ridges spanning the tymbal from dorsal to ventral margin, and a 5th, most proximal, ridge almost reaching ventral margin. Lateral band of four intercalary ridges weakly developed.

Opercula: Male operculum (fig. 87) very small, not covering tymbal cavity, leaving a wide gap between operculum and abdomen; folded membrane completely visible in ventral view. Distal part of operculum shorter than basal part, angularly oblong, and erect, not reaching medially of meracanthus. Lateral margin short and straight, concavely curving into crest of basal part and forming an obtuse angle with long and straight distal margin. Medial margin straight, distomedial corner almost rectangular. Meracanthus reaching beyond operculum and just beyond edge of folded membrane. Female operculum (fig. 90) very similar to that of males, with angularly oblong distal part.

Abdomen: Male abdomen distinctly inflated. First tergite short, not hidden under metanotum. Medial part of 2nd tergite nearly twice as long as lateral parts. Anterior margin of 2nd tergite concave medially. Auditory capsules weakly inflated. First and 2nd sternites not adjacent. Female caudodorsal beak in dorsal view (fig. 91) narrow triangular and rounded, almost pointed at apex. Ovipositor sheaths reaching just beyond apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 84. Dorsal margin straight, though concave at base of caudodorsal beak and angularly bent into short and straight beak. Distal margin weakly convex, not forming a lobe on pygofer, and concavely bent into margin of beak. Ventral margin almost straight. Pygofer from behind with almost parallel ventral margins; basal part of pygofer opening broad U-shaped (fig. 83). Caudodorsal beak in dorsal view (fig. 88) short triangular, and rounded or truncate at apex. Lateral lobe of pygofer gradually curving inwards towards end of distal margin, forming a fairly large, distinctly swollen and bluntly rounded lateral protuberance. Claspers (fig. 89) closely resembling those of *P. ungula*, with dorsal part forming a globularly rounded, but larger, protuberance adjacent to aedeagus, and supporting aedeagus in upright position. Apical parts of claspers strongly curved down and slightly diverging towards apices, forming a long, slender, and sharply pointed ridge along their convex distal margins. This ridge arches into a small, lobate lateral protuberance at the base of clasper. Medial part of clasper membranous and almost transparent between apex and base. Aedeagus (fig. 85) weakly upcurved, abruptly narrowing and strongly curved down near apex. Aedeagus with very slender lateral crests and a distinct pair of dorsal ridges. Aedeagal pore round (fig. 86).

Measurements: Body length ♂: 15.5-21.0 mm ($\bar{x}$ 17.5 mm ± 1.1), ♀: 14.9-17.0 mm ($\bar{x}$ 15.9 mm ± 0.7); tegmen length ♂: 16.5-21.0 mm ($\bar{x}$ 18.8 mm ± 1.0), ♀: 18.7-21.0 mm ($\bar{x}$ 19.8 mm ± 0.7); head length ♂: 1.5-1.9 mm ($\bar{x}$ 1.6 mm), ♀: 1.5-1.8 mm ($\bar{x}$ 1.7 mm); pronotum length ♂: 1.6-2.2 mm ($\bar{x}$ 1.8 mm), ♀: 1.8-2.2 mm ($\bar{x}$ 1.9 mm); mesonotum length ♂: 3.1-4.1 mm ($\bar{x}$ 3.4 mm), ♀: 3.2-3.9 mm ($\bar{x}$ 3.4 mm); head width ♂: 3.0-3.9 mm ($\bar{x}$ 3.4 mm), ♀: 3.5-4.0 mm ($\bar{x}$ 3.8 mm); width of pronotal collar ♂: 4.0-5.4 mm ($\bar{x}$ 4.4 mm), ♀: 4.5-5.0 mm ($\bar{x}$ 4.8 mm).

Figs. 83-91. *Papuapsaltria nana* (Jacobi, 1903): 83, pygofer from aslant, Peria Creek; 84, pygofer in lateral view, Peria Creek; 85, aedeagus in lateral view, Popondetta; 86, aedeagal apex, Popondetta; 87, male operculum Popondetta; 88, male caudodorsal beak in dorsal view, Popondetta; 89, claspers, Peria Creek, arrow indicating membranous medial part; 90, female operculum, Kwagira River; 91, female caudodorsal beak, Kwagira River.

Figs. 92-101. *Papuapsaltria bidigitula* sp. n.: 92, pygofer in lateral view, holotype; 93, pygofer from aslant, Feramin; 94, aedeagus in lateral view, holotype; 95, aedeagal apex in lateral view, holotype; 96, aedeagus in lateral view, Wetar; 97, male caudodorsal beak in dorsal view, holotype; 98, female caudodorsal beak in dorsal view, Wetar; 99, male operculum, holotype; 100, claspers, Wetar; 101, female operculum, Wetar.

Distribution (fig. 3). – *P. nana* is recorded from the Huon- and Papuan peninsulas of New Guinea, and from Normanby Island of the D'Entrecasteaux Islands.

Papuapsaltria bidigitula sp. n.
(figs. 3, 92-101)

Type material. – Holotype ♂: 'NEW GUINEA: (NE) / Feramin, 150-120 m / June 15-18, 1959' [print], 'W. W. Brandt / Collector / BISHOP' [print], BPBM. – Paratypes: IRIAN JAYA: Ansus, A.B. Mayer, 1893, 1♂, BMNH; Jobie, R.H.F. Rippon, N.M.W., 1918.93. 1♂, NMWC; PAPUA NEW GUINEA: same data as holotype 1♀; same data but 23-31.v.1959, 1♀; 1-6.vi.1959, 2♀; 7-14.vi.1959, 1♂; all BPBM; Damanti, Finisterre Mts., Morobe Dist., 2-11.x.1964, M.E. Bacchus, 1♂, 4♀, BMNH; Eliptamin Valley, 1200-1350 m, 16-30.viii.1959, W.W. Brandt, 1♂, ZMAN; same data but 19-30.viii.1959, 1♀, BPBM; WETAR ISLAND: Wetter near Timor, W. Doherty, 1903.31, 1♂, 1♀, BMNH.

P. bidigitula shares a bifurcate clasper with *P. plicata*, *P. stoliodes*, and *P. ungula*. The species is easily recognized by the shape of its clasper base, forming a broad, ring-shaped collar, often with two distinct paramedian protrusions at the base of the anal valves. The shapes of the clasper and, especially, of the aedeagus are variable, suggesting that the material might belong to several species.

Description

Body reddish brown. Females smaller than males, but with more robust head and thorax, and longer tegmina. Tegmina of males 1.2-1.3× as long as body length, of females 1.3-1.5×. Male abdomen 1.2-1.7× as long as head and thorax, of females 1.1-1.3×.

Head: Vertex and postclypeus with short red-brown setae. Postclypeus broad, distinctly protruding beyond vertex lobes and smoothly rounded anteriorly. Anterior margin of postclypeus weakly convex, but sharply curving back at lateral corners, forming almost right angles with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) concave. Distance between lateral ocelli 1.0-1.4× as long as distance between lateral ocellus and eye and 1.8-3.0× the width of frontal ocellus.

Legs: Fore femur with row of three spines. Most proximal spine generally very short and strongly bent, almost adjacent to femur, but longer and more erect in specimens from Wetar and Ansus. Proximal spine much shorter than distance to middle spine.

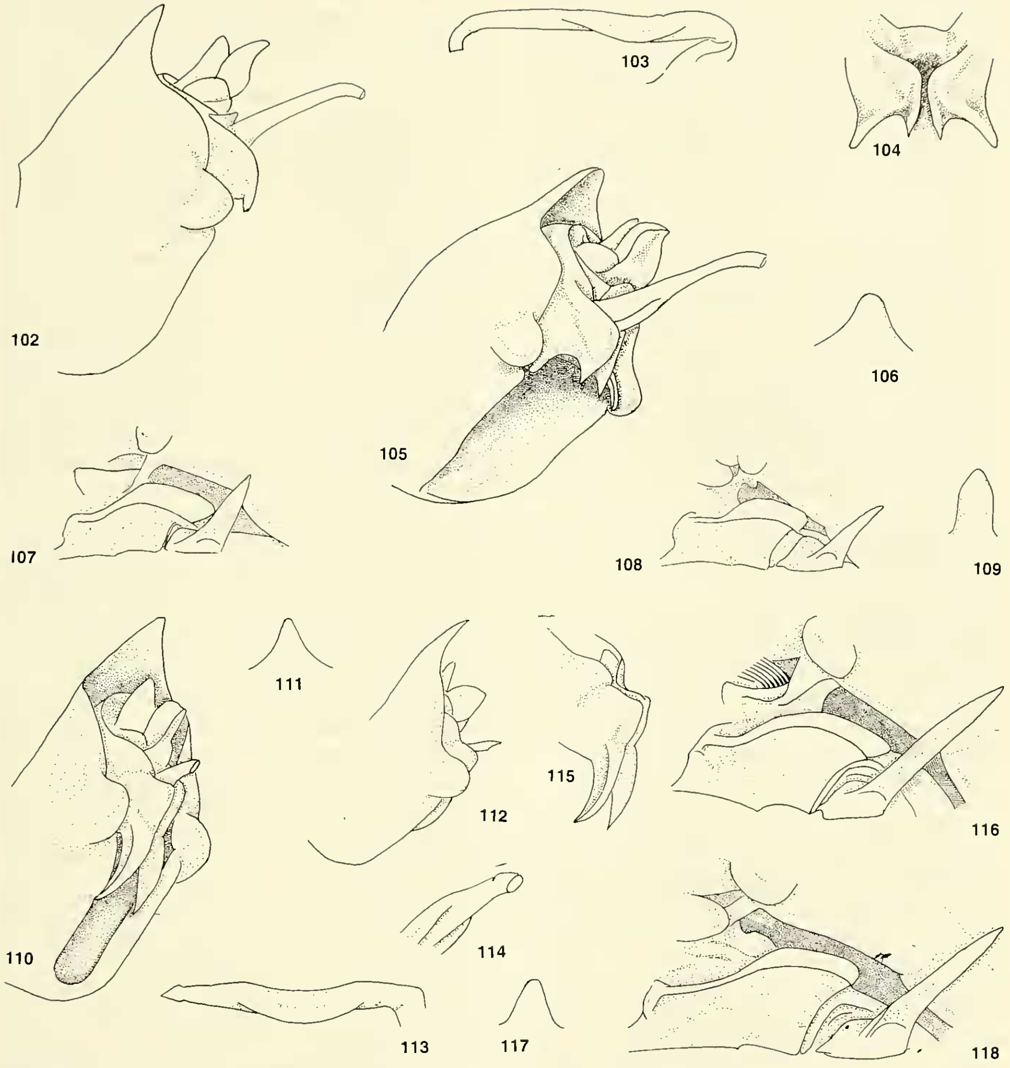
Tegmina: Hyaline, with 8 apical areas, a distinct costal area and a fairly broad hyaline border along hind margin.

Tymbals: Six slightly sclerotized parallel ridges spanning the tymbal from dorsal to ventral margin. Lateral band of seven intercalary ridges weakly developed.

Opercula: Male operculum (fig. 99) very small, not covering tymbal cavity in ventral view and generally leaving folded membrane exposed, but covering most of folded membrane in specimen from Ansus. Distal part of operculum shorter than basal part, angularly oblong and erect, not reaching medially of meracanthus. Lateral margin long and straight, concavely curving into crest of basal part and forming an obtuse angle with long and straight distal margin. Medial margin short and straight, distomedial corner almost rectangular. Meracanthus reaching beyond operculum, but not reaching to margin of abdominal segment 2. Female operculum (fig. 101) very similar to that of male, with angularly oblong distal part.

Abdomen: Male abdomen hardly inflated. First tergite short, almost completely hidden under metanotum middorsally. Medial part of 2nd tergite slightly less than 2× as long as lateral parts. Anterior margin of 2nd tergite weakly concave medially. First and 2nd sternites generally not adjacent, but adjacent in specimen from Ansus. Auditory capsules distinctly inflated. Female caudodorsal beak in dorsal view (fig. 98) triangular and pointed at apex. Ovipositor sheaths reaching just beyond apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 92. Dorsal margin almost straight and angularly concave at base of caudodorsal beak. Distal margin weakly convex, forming an obtuse angle with margin of beak. Ventral part of pygofer lobe forming an angular corner under lateral protuberance. Ventral margin straight. Ventral margins converging to base of pygofer; basal part of pygofer opening broad, V-shaped (fig. 93). Caudodorsal beak in dorsal view (fig. 97) short triangular, almost pointed at apex. Lateral lobe of pygofer weakly curving inwards towards end of distal margin, but recurving near ventral margin, forming a broad, rectangular and weakly swollen laminiform protuberance. Claspers (fig. 100) distinctly bifurcate, very short and broad, angular in lateral view, and slightly diverging towards apices. Dorsal margin straight, curving down at rounded distodorsal corner. Clasper weakly inflated around aedeagus, and forming a thorn-shaped and sharply pointed apical protrusion and a generally more rounded lateral protrusion. In some specimens the lateral protrusion is the longest, in others the apical protrusion. Basal parts of claspers fuse to a broad and smoothly rounded collar around base of anal valves. This collar generally with two, almost finger-shaped, paramedian pro-



Figs. 102-109. *Papuapsaltria spinigera* sp. n. – 102, pygofer in lateral view, Korop; 103, aedeagus in lateral view, paratype; 104, claspers, holotype; 105, pygofer from aslant, holotype; 106, male caudodorsal beak in dorsal view, holotype; 107, male operculum, holotype; 108, female operculum, Okapa; 109, female caudodorsal beak in dorsal view, Okapa.
Figs. 110-118. *Papuapsaltria ustulata* (Blöte, 1960). – 110, pygofer from aslant, holotype; 111, male caudodorsal beak in dorsal view, holotype; 112, pygofer in lateral view, holotype; 113, aedeagus in lateral view, Kutsime; 114, aedeagal apex, Kutsime; 115, claspers, holotype; 116, male operculum, holotype; 117, female caudodorsal beak in dorsal view, Kutsime; 118, female operculum, Kutsime.

trusions at its dorsal margin, which are only weakly developed in the specimens from Damanti and Feramin, and absent in the specimen from Eliptamin. Aedeagus quite long, slender, and S-curved, with broad and angular lateral crests and a distinct dorsal crest. Aedeagus in the western part of the distribution area (Ansus, Jobi and Wetar) with slender dorsal crest and gradually curving down to apex (fig. 96), but in all other specimens, with more angular dorsal crest and more angularly bent near apex (fig. 94). Aedeagal pore weakly incised, almost round (fig. 95).

Measurements: Body length ♂: 13.1-16.2 mm ($\bar{x}$ 14.7 mm ± 1.1), ♀: 11.6-15.6 mm ($\bar{x}$ 14.2 mm ± 1.3); tegmen length ♂: 15.7-20.4 mm ($\bar{x}$ 19.0 mm ±

1.9), ♀: 15.5-22.4 mm (x̄ 20.6 mm ± 2.3); head length ♂: 1.1-1.4 mm (x̄ 1.2 mm), ♀: 1.1-1.4 mm (x̄ 1.3 mm); pronotum length ♂: 1.4-1.7 mm (x̄ 1.6 mm), ♀: 1.5-2.0 mm (x̄ 1.8 mm); mesonotum length ♂: 2.7-3.8 mm (x̄ 3.2 mm), ♀: 3.0-3.5 mm (x̄ 3.2 mm); head width ♂: 3.2-3.4 mm (x̄ 3.3 mm), ♀: 3.0-3.8 mm (x̄ 3.5 mm); width of pronotal collar ♂: 3.6-4.4 mm (x̄ 4.0 mm), ♀: 3.7-4.9 mm (x̄ 4.5 mm).

Distribution (fig. 3). – *P. bidigitula* has a very peculiar distribution. The species is recorded from northern and central Irian Jaya, Yapen Island, and from Wetar Island. Since the species has not been recorded from any of the intermedate Banda islands, the record from Wetar is considered dubious.

Etymology. – Digitulus is the diminutive form of digita (Latin) finger; the name refers to the two small finger-shaped protuberances on the ring-shaped dorsal parts of the claspers.

Papuapsaltria spinigera sp. n.

(figs. 3, 102-109)

Type material. – Holotype ♂: 'E Highlands Dist., Okapa c 5000 ft. 20.xii.1964 R.H. Hornbrook' [-print]; 'M.E. Bacchus BM 1965-120' [print]; 'British Museum' [print], BMNH. – Paratypes: PAPUA NEW GUINEA: same data as holotype 1♂, 1♀, BMNH; Korop Upper Jimi R. 1300 m, 12.vii.1955, J.L. Gressitt, 1♂, BPBM.

P. spinigera is presumably closely related to the five foregoing species, sharing a similarly bifurcate clasper. *P. spinigera* is distinctly smaller than these species and is easily recognized by the long lateral protrusion of its clasper, which is longer than the apical part of clasper.

Description

Body greenish brown. Female smaller than males, but with more robust head and thorax, and longer tegmina. Tegmina of males 1.2-1.3× as long as body length, of female 1.5×. Male abdomen 1.2-1.4× as long as head and thorax, of female 1.0×.

Head: Vertex and postclypeus with short red-brown setae. Postclypeus broad, distinctly protruding beyond vertex lobes and smoothly rounded anteriorly. Anterior margin of postclypeus almost straight, but sharply curving back at lateral corners, forming almost right angles with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) concave. Diverging fissures on vertex weakly developed. Distance between lateral ocelli in males 1.0 x, in females 1.2 x, as long as distance between lateral ocellus and eye and 1.6-1.8× the width of frontal ocellus.

Legs: Fore femur with row of three erect spines. Most proximal spine very short, hardly longer than middle spine and much shorter than distance to middle spine.

Tegmina: Hyaline, with 8 long and slender apical areas, a distinct costal area, and a fairly broad hyaline border along hind margin.

Tymbals: Seven slightly sclerotized parallel ridges spanning the tymbal from dorsal to ventral margin, and an 8th, most proximal, ridge spanning only about 3/4 of tymbal width. Lateral band of seven intercalary ridges weakly developed.

Opercula: Male operculum (fig. 107) very small, not covering tymbal cavity, but leaving only a narrow gap between operculum and abdomen; folded membrane not visible in ventral view. Distal part of operculum shorter than basal part, angularly oblong, and erect, not reaching medially of meracanthus. Lateral margin short and straight, concavely curving into crest of basal part and forming an obtuse angle with long and straight distal margin. Medial margin straight, distomedial corner almost rectangular. Meracanthus reaching beyond anterior margin of abdominal segment 2. Female operculum (fig. 108) very similar to that of males, with angularly oblong distal part.

Abdomen: Male abdomen not inflated. First tergite very short. Medial part of 2nd tergite only slightly longer than lateral parts. Anterior margin of 2nd tergite straight medially. First and 2nd sternites adjacent. Auditory capsules strongly inflated. Abdomen of the only female specimen available dried in and twisted. Female caudodorsal beak in dorsal view (fig. 109) narrow, triangular, and bluntly rounded at apex. Ovipositor sheaths reaching distinctly beyond apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 102. Dorsal margin almost straight and almost continuous with straight margin of short and stout caudodorsal beak. Distal margin angularly convex, forming a distinct distal lobe on pygofer, and concavely bending into margin of beak. Ventral margin straight. Pygofer from behind with almost parallel ventral margins; basal part of pygofer opening broad, U-shaped (fig. 105). Caudodorsal beak in dorsal view (fig. 106) short triangular, wirh concave margins and rounded apex. Lateral lobe of pygofer weakly curving inwards towards end of distal margin, forming a small, lobate, almost laminiform protuberance, projecting beyond pygofer margin. Claspers (fig. 104) distinctly bifurcate, very short and broad, angular in lateral view, and slightly diverging towards apices. Dorsal margin straight, curving down at rounded distodorsal corner and slightly bending inwards distally of aedeagus. Apical part of clasper short, thorn-shaped, directed downwards, with a small inwards directed clasper hollow. Clasper forming a long, spiny, but apically rounded lateral protuberance near its base. This lateral protuberance is longer than the apical part of clasper. Clasper base not forming a distinct collar around base of anal valves. Aedeagus (fig. 103) very long, reaching far beyond apex of caudodorsal beak, weakly S-curved, narrowing and strongly curving down near apex. Lateral crests short and restricted to proximal half of aedeagus. Aedeagal pore round.

Measurements: Body length ♂: 11.8-12.7 mm, ♀: 11.5 mm; tegmen length ♂: 14.3-16.2 mm, ♀: 16.7 mm; head length ♂: 1.0-1.1 mm, ♀: 1.1 mm; pronotum length ♂: 1.4-1.5 mm, ♀: 1.5 mm; mesonotum length ♂: 2.6-3.0 mm, ♀: 3.0 mm; head width ♂: 2.7-3.0 mm, ♀: 3.1 mm; width of pronotal collar ♂: 3.3-3.8 mm, ♀: 4.0 mm.

Distribution (fig. 3). – *P. spinigera* is probably restricted to northeastern Papua New Guinea.

Etymology. – Spinigera (Latin) means spiny and refers to the lateral spine on the clasper.

Papuapsaltria ustulata (Blöte, 1960) comb. n. (figs. 110-118, 129)

Baeturia ustulata Blöte, 1960: 75, fig. 32; Duffels & Van der Laan 1985: 255; De Boer 1993a: 16.

P. ustulata is a small species with sharply pointed pick-shaped claspers, males can further be recognized by a very short distal part of the operculum and an extremely long meracanthus.

Description

Body bicolorate: head and thorax ochraceous, tinged with green, abdomen more reddish brown. Females larger than males. Tegmina of males 1.1-1.2× as long as body length, of females 1.2×. Male abdomen 1.4-1.5× as long as head and thorax, of females 1.1-1.4×.

Head: Ochraceous. Postclypeus and anterior part of vertex lobes with some short red-brown setae. Postclypeus slightly protruding, almost oblong-shaped and smoothly rounded anteriorly. Anterior margin of postclypeus weakly convex, almost continuous with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) concave, strongly concave in holotype. Lateral parts of postclypeus very smooth, with some weak furrows, but almost without rows of parallel ridges. Ocelli fairly close together. Distance between lateral ocelli 1.5-1.8× as long as distance between lateral ocellus and eye and 0.8-1.1× the width of frontal ocellus.

Thorax: Pronotum with weak medial furrow. Mesonotum greenish, cruciform elevation ochraceous.

Legs: Femora ochraceous, tibiae and tarsi reddish. Fore femur with row of three erect spines. Proximal spine fairly long in holotype, longer than middle spine and almost as long as distance to middle spine, but in other specimens only slightly longer than middle spine and distinctly shorter than distance to middle spine.

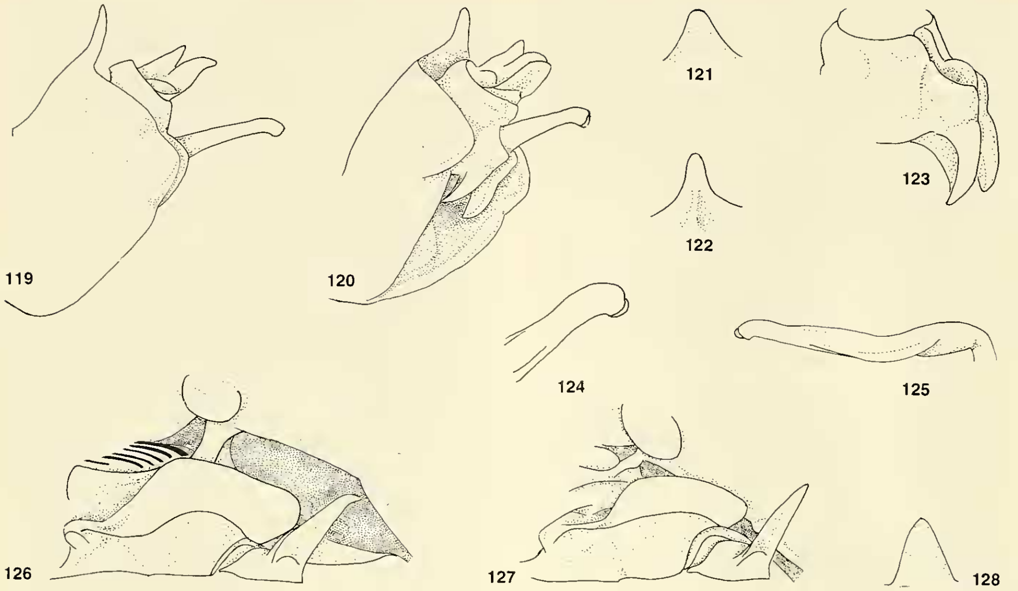
Tegmina: Hyaline, with 8 apical areas and a distinct hyaline costal area. Hyaline border along hind margin of tegmen fairly narrow in holotype, distinctly broader in other specimens.

Tymbals: Holotype with seven transverse sclerotized ridges from dorsal to ventral margin and an 8th, most proximal, ridge almost reaching ventral margin. Other specimens with one complete ridge less.

Opercula: Male operculum (fig. 116) very short, but partly covering tymbal cavity in ventral view, leaving a narrow gap between operculum and abdomen; folded membrane hardly visible in ventral view. Distal part of operculum very short and erect, hardly more than a continuation of the crest along distolateral corner of basal part, only slightly amplifying mesiad to less than 1/3 as long as basal part. Lateral margin convexly bent into straight distal margin. Distal margin forming a sharp angle with short medial margin. Meracanthus very long and slender, reaching beyond anterior margin of abdominal segment 3. Female operculum (fig. 118) as in male.

Abdomen: Red-brown, distal part green in holotype. One specimen with row of dark ventrolateral spots on segments 3-7. Male abdomen very slender, not inflated. First tergite very short and middorsally almost completely hidden under metanotum. Medial part of 2nd tergite slightly longer than lateral parts. Anterior margin of 2nd tergite straight medially. First and 2nd sternites adjacent. Auditory capsules very large, bulgy, clearly visible in dorsal view. Female abdomen even more slender than in male. Female caudodorsal beak in dorsal view (fig. 117) triangular, rounded at apex. Ovipositor sheaths just reaching beyond apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 112. Dorsal margin weakly concave, convexly bent into straight and slender caudodorsal beak. Distal margin weakly convex between caudodorsal beak and lateral protuberance, concavely bent into margin of beak, not forming a distal lobe on pygofer. Caudodorsal beak in dorsal view (fig. 111) very slender, with concave margins, rounded or pointed at apex. Lateral lobe of pygofer sharply bent inwards, especially in holotype, forming a large angular, slightly posteriorly protruding and distinctly swollen protuberance. Pygofer forming an angular, in holotype more rounded, corner just below this protuberance. Ventral margin of pygofer weakly convex. Ventral half of pygofer opening narrow U-shaped (fig. 110),



Figs. 119-128. *Papuapsaltria baasi* sp. n.: 119, pygofer in lateral view, Mokai; 120, pygofer from aslant, Mokai; 121, male caudodorsal beak in dorsal view, Tor River; 122, male caudodorsal beak in dorsal view, Mokai; 123, claspers, Mokai; 124, aedeagal apex, Mokai; 125, aedeagus in lateral view, Bodem; 126, male operculum, Mokai; 127, female operculum, Bodem; 128, female caudodorsal beak in dorsal view, Bodem.

with weakly concave basal margin; ventral margins almost parallel. Claspers (fig.115) very short, hardly reaching beyond pygofer margin, and weakly diverging towards apices; pick-shaped, with rectangular square-shaped dorsal part and slender, slightly recurving, sharply pointed, and downwards directed apical part. Dorsal part of clasper curving mesiad, as a shaft encircling aedeagus, and supporting aedeagus in upright position. Apical part of clasper with large and sharply edged clasper hollow. Basal parts of claspers curving inwards, but not fusing, forming an almost continuous collar around base of anal valves. Aedeagus standing erect between claspers, adjacent to anal valves. Aedeagus (fig. 113) weakly S-curved, almost straight, but angularly bent near apex, with distinct lateral crests and a weak dorsal ridge. Apical part of aedeagus abruptly broadening, and forming a small and angular protrusion at apical bending point. Aedeagal pore oval, almost round (fig. 114).

Measurements: Body length ♂: 13.2-13.7 mm, ♀: 14.5 & 16.4 mm; tegmen length ♂: 15.1-16.4 mm, ♀: 19.9 mm; head length ♂: 1.0-1.2 mm, ♀: 1.3 & 1.5 mm; pronotum length ♂: 1.5-1.6 mm, ♀: 1.9 mm; mesonotum length ♂: 2.8-3.0 mm, ♀: 3.4 & 3.6 mm; head width ♂: 2.9-3.3 mm, ♀: 3.4 & 3.7 mm; width of pronotal collar ♂: 3.6-3.9 mm, ♀: 4.7 & 4.8 mm.

Material examined. – IRIAN JAYA: Bernhard Camp, 100 m, 10.iv.1939, Neth Ind. – American New Guinea Expedit., L.J. Toxopeus, ♂ holotype *Baeturia ustulata*, RMNH; Karubaka, Swart vall., 1300 m, 1.xi.1958, J.L.

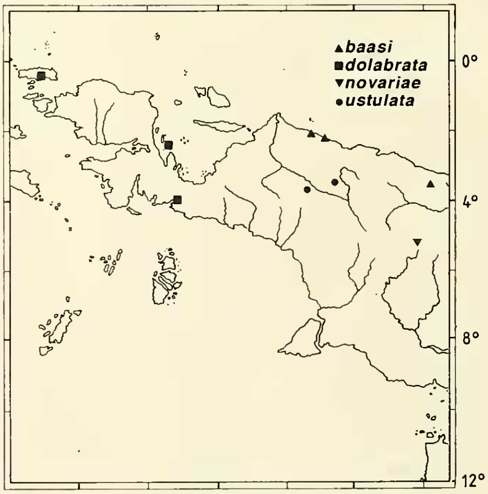


Fig. 129. Localities of *Papuapsaltria baasi*, *P. dolabrata*, *P. novariae*, and *P. ustulata*.

Gressitt, 2♂, BPBM; Kutsime, West of Swart vall., 1500 m, 14.xi.1958, J.L. Gressitt, 2♀, BPBM.

Distribution (fig. 129). – *P. ustulata* is endemic to central western New Guinea, north of the central mountain ranges.

Papuapsaltria baasi sp. n.
(figs. 119-129)

Type material. – Holotype ♂: 'NEW GUINEA NETH. / Bodem, 100 m, 11 km / SE Oerberfaren / July 7-17, 1959' [print]; 'T.C. Maa / Collector / Bishop' [print], BPBM. – Paratypes: IRIAN JAYA: same data as holotype 1♂, 4♀, BPBM; same data 1♂, 1♀, ZMAN; Tor river (mouth), 4 km E of Hol Maffen, 1.vii.1959, T.C. Maa, 1♂, BPBM.

Other material. – PAPUA NEW GUINEA: Mokai vill., Torricelli Mts., 700 m, 16-31.xii.1958, W.W. Brandt, 1♂, BPBM; same data but 750 m, 1-23.i.1959, 1♂, BPBM.

P. baasi closely resembles *P. ustulata* and is of about the same size, but has distinctly larger opercula. Males can be easily separated from *P. ustulata* by the claspers, which are fused to a high and smoothly rounded collar around the base of anal valves. A similar collar is found in *P. novariae* and *P. dolabrata*, which are described below.

Description

Body reddish brown. Females of about the same size as males, with relatively slightly longer tegmina and a more robust head and thorax. Tegmina of males 1.1-1.3× as long as body length, of females 1.2-1.3×. Male abdomen 1.2-1.5× as long as head and thorax, of females 1.1-1.4×.

Head: Reddish brown, with short red-brown setae. Postclypeus oblong, distinctly protruding beyond vertex lobes and smoothly rounded anteriorly. Anterior margin of postclypeus weakly convex, but sharply curving back at lateral corners, forming almost right angles with anterior margins of vertex lobes. Dorsal surface of postclypeus weakly undulated; laterally slightly indented. Postclypeus not swollen; anterior margin (lateral view) concave. Lateral parts of postclypeus very smooth, with some weak furrows, but almost without rows of parallel ridges along lorum. Distance between lateral ocelli 1.0-1.2× as long as distance between lateral ocellus and eye and 2.1-2.8× the width of frontal ocellus.

Thorax: Pronotum with weak medial furrow. Mesonotum greenish, cruciform elevation ochraceous.

Legs: Femora ochraceous, tibiae and tarsi reddish. Fore femur with row of three erect spines. Proximal spine fairly long, often slightly longer than middle spine, but much shorter than distance to middle spine.

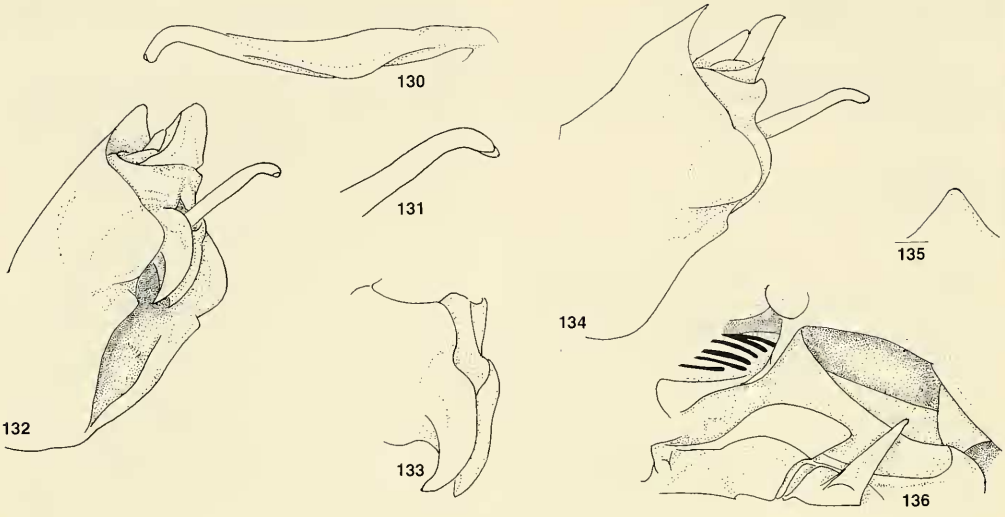
Tegmina: Hyaline, with 8 apical areas and a very narrow costal area; specimen from Tor River with 7 apical areas in right tegmen. Hyaline border along hind margin of tegmen fairly narrow as in holotype of *P. ustulata*, but distinctly broader in one female.

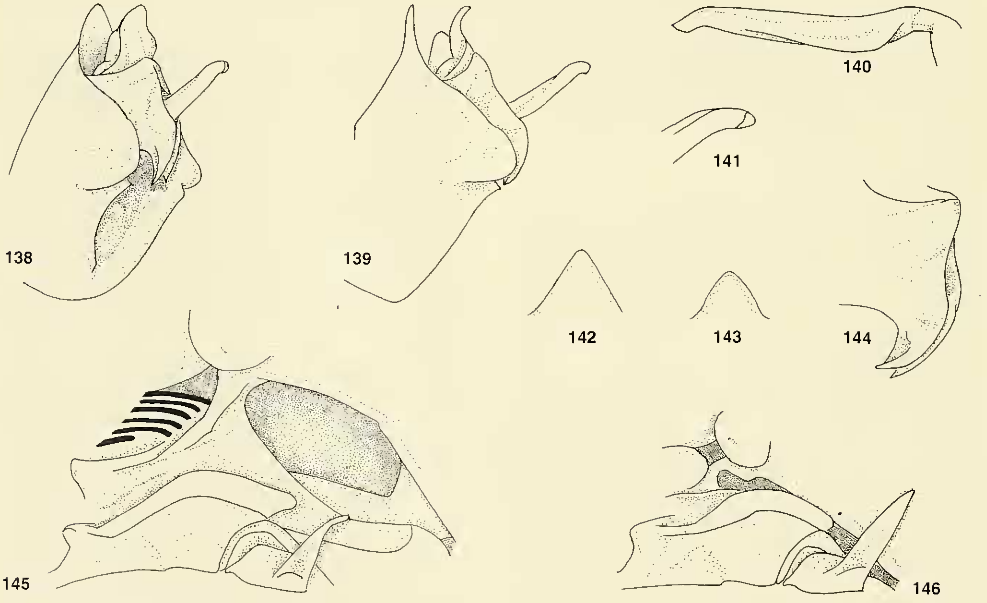
Tymbals: Five transverse sclerotized ridges spanning the tymbal from dorsal to ventral margin and a 6th, most proximal, ridge almost reaching ventral margin. Intercalary ridges weakly developed.

Opercula: Male operculum (fig. 126) small, but distinctly longer than in *P. ustulata*, only partly covering tymbal cavity in ventral view, leaving a narrow gap between operculum and abdomen; folded membrane hardly visible in ventral view. Distal part of operculum almost as long as basal part. Lateral margin long and straight, forming an obtuse angle with crest of basal part and with straight distal margin. Medial margin weakly convex; distomedial corner rounded. Meracanthus not reaching to anterior margin of abdomen. Female operculum (fig. 127) as in male, but with shorter distal part.

Abdomen: Red-brown. Male abdomen very slender, not inflated. First tergite very short, almost completely hidden under metanotum middorsally. Medial part of 2nd tergite less than 1.5× as long as lateral parts. Anterior margin of 2nd tergite weakly concave medially. First and 2nd sternites adjacent. Auditory capsules very large, bulgy, clearly visible in dorsal view. Female abdomen even more slender than in male. Female caudodorsal beak in dorsal view (fig. 128) triangular and pointed at apex. Ovipositor sheaths just reaching beyond apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 119. Dorsal margin weakly concave to base and angularly bent into slender caudodorsal beak. Caudodorsal beak straight in type specimens, but recurved in Mokai specimens. Distal margin weakly convex between caudodorsal beak and lateral protuberance, but not forming a distal lobe on pygofer; and concavely, in Mokai specimens angularly, bent into margin of beak. Caudodorsal beak in dorsal view apically rounded, broadly triangular in type specimens (fig. 121), very slender and with a sharp medial ridge at its base in Mokai specimens (fig. 122). Lateral lobe of pygofer slightly curved inwards, but recurved towards ventral margin, forming a broad, rounded, laminiform protuberance. Pygofer of specimen from Tor River forming an angular corner just below this protuberance, such a corner is absent in other specimens. Ventral margin of pygofer almost straight. Ventral half of pygofer opening narrow V-shaped (fig. 120); ventral margins converging to a sharp angle at the





Figs. 130-136. *Papuapsaltria novariae* sp. n. – 130, aedeagus in lateral view, holotype; 131, aedeagal apex, holotype; 132, pygofer from aslant, holotype; 133, claspers, holotype; 134, pygofer in lateral view, holotype; 135, caudodorsal beak in dorsal view, holotype; 136, operculum, paratype.

Figs. 138-146. *Papuapsaltria dolabrata* sp. n. – 138, pygofer from aslant, holotype; 139, pygofer in lateral view, holotype; 140, aedeagus in lateral view, Etna Bay; 141, aedeagal apex, Etna Bay; 142, male caudodorsal beak in dorsal view, holotype; 143, female caudodorsal beak in dorsal view, Roon; 144, claspers, holotype; 145, male operculum, paratype Waigeu; 146, female operculum, Roon.

base of pygofer opening. Claspers (fig. 123) very short as in *P. ustulata,* hardly reaching beyond pygofer margin, and slightly diverging towards apices; pick-shaped, with rectangular square-shaped dorsal part and slender, downwards directed, slightly recurving and sharply pointed apical part. Dorsal part of clasp-

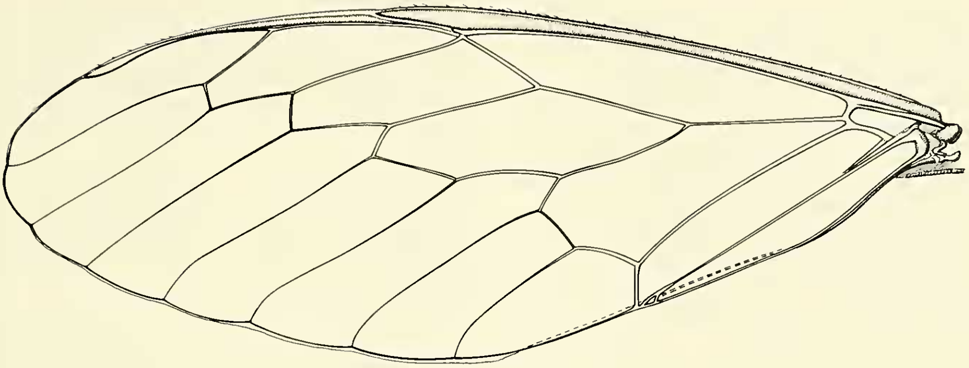


Fig. 137. *Papuapsaltria dolabrata* sp. n.: left tegmen, male, Waigeu .

er curving mesiad, as a shaft encircling aedeagus, and supporting aedeagus in upright position. Apical part of clasper broader than in *P. ustulata*, with large and sharply edged clasper hollow. Basal parts of claspers fused at distinct medial ridge, forming a high and smoothly rounded continuous collar around base of anal valves. Aedeagus standing erect between claspers, adjacent to anal valves. Aedeagus (fig. 125) almost straight, but strongly curved down, and abruptly narrowing near slightly incised apex (fig. 124), with slender lateral crests and a weak dorsal ridge. Aedeagus in one specimen from Mokai distinctly broader than in other specimens.

Measurements: Body length ♂: 11.7-14.5 mm ($\bar{x}$ 13.0 mm ± 0.9), ♀: 12.1-13.7 mm ($\bar{x}$ 12.9 mm ± 0.5); tegmen length ♂: 13.7-17.5 mm ($\bar{x}$ 15.5 mm ± 1.4), ♀: 15.6-16.9 mm ($\bar{x}$ 16.3 mm ± 0.6); head length ♂: 1.1-1.3 mm ($\bar{x}$ 1.2 mm), ♀: 1.2-1.5 mm ($\bar{x}$ 1.4 mm); pronotum length ♂: 1.4-1.6 mm ($\bar{x}$ 1.5 mm), ♀: 1.5-1.7 mm ($\bar{x}$ 1.6 mm); mesonotum length ♂: 2.3-3.2 mm ($\bar{x}$ 2.8 mm), ♀: 2.6-3.0 mm ($\bar{x}$ 2.8 mm); head width ♂: 2.8-3.3 mm ($\bar{x}$ 3.0 mm), ♀: 3.0-3.3 mm ($\bar{x}$ 3.2 mm); width of pronotal collar ♂: 3.4-4.1 mm ($\bar{x}$ 3.7 mm), ♀: 3.5-4.1 mm ($\bar{x}$ 3.8 mm).

Distribution (fig. 129). – *P. baasi* is endemic to the mountain ranges of northern New Guinea.

Etymology. – This species is named in honour of Hendrik Baas in acknowledgement of our long discussions on the paleogeography of New Guinea.

Papuapsaltria novariae sp. n.
(figs. 129-136)

Type material. – Holotype ♂: 'NEW GUINEA NE / Eliptamin Valley / 1200-1350 m / July 16-31, 1959' [print]; 'W.W. Brandt / Collector / Bishop' [print], BPBM. – Paratype: IRIAN JAYA: same data as holotype but 1665-2530 m, 9.vi.1959, 1♂, BPBM.

Only two males are known of this species. *P. novariae* closely resembles *P. baasi* in the shape of the genitalia: its clasper base forming a similarly high collar around the base of the anal valves. The dorsal corner of the *P. novariae* clasper is more rounded, however. *P. novariae* is distinctly larger than the two foregoing species and shows a much wider gap between operculum and abdomen. The species shares the latter character with *P. dolabrata* described next. *P. novariae* can further be recognized by its 9 apical areas in the tegmina.

Description

Body reddish brown. Tegmina 1.2-1.3× as long as body length. Abdomen 1.4-1.6× as long as head and thorax.

Head: Reddish brown, with short red-brown setae. Postclypeus oblong, slightly protruding beyond vertex lobes and smoothly rounded anteriorly. Anterior margin of postclypeus weakly convex, but sharply curving back at lateral corners, forming almost right angles with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) straight. Lateral parts of postclypeus very smooth, with some weak furrows, but almost without rows of parallel ridges along lorum. Distance between lateral ocelli slightly longer than distance between lateral ocellus and eye and 1.7-1.9× the width of frontal ocellus.

Legs: Femora ochraceous, tibiae and tarsi reddish. Fore femur with row of three erect spines. Proximal spine very short, slightly longer than middle spine, but much shorter than distance to middle spine.

Tegmina: Hyaline, with 9 apical areas, a distinct and hyaline costal area, and a fairly narrow hyaline border along hind margin.

Tymbals: Five transverse sclerotized ridges spanning the tymbal from dorsal to ventral margin and a 6th, most proximal, ridge almost reaching ventral margin. Intercalary ridges hardly visible.

Operculum (fig. 136): Very short. Distal part more than half as long as basal part, not covering tymbal cavity, and leaving a very wide gap between operculum and abdomen; folded membrane clearly visible in ventral view. Lateral margin long and straight, forming an obtuse angle with crest of basal part and angularly or convexly bending into straight distal margin. Medial margin straight, forming a sharp angle with distal margin. Meracanthus reaching to about halfway the gap between operculum and abdomen.

Abdomen: Red-brown, more inflated than in the two foregoing species. First tergite very short, almost completely hidden under metanotum middorsally. Medial part of 2nd tergite almost 2 × as long as lateral parts. Anterior margin of 2nd tergite distinctly concave medially. First and 2nd sternites not adjacent. Auditory capsules weakly swollen and not visible in dorsal view.

Genitalia: Pygofer in lateral view as in fig. 134. Dorsal margin concave, but convexly, almost angularly, bent into straight and slender caudodorsal beak. Distal margin weakly convex between caudodorsal beak and lateral protuberance, but not forming a distal lobe on pygofer, and concavely bent into margin of beak. Caudodorsal beak in dorsal view (fig. 135) broadly triangular and bluntly rounded at apex. Lateral lobe of pygofer slightly curved inwards, but recurved towards ventral margin, forming a broad, rounded, and laminiform protuberance. Pygofer forming a small rectangular corner just below this protuberance. Ventral margin of pygofer almost straight. Ventral half of pygofer opening narrow V-shaped (fig. 132); ventral margins converge to a sharp angle at base of pygofer opening. Claspers (fig. 133) closely resembling those of *P. baasi*, but almost parallel, only slightly diverging near apices. Claspers hardly reaching beyond pygofer margin, their basal parts fused at distinct medial ridge, forming a high and smoothly rounded continuous collar around base of anal valves. Dorsal part of clasper more rounded than in *P. baasi*, curving mesiad, as a shaft encircling aedeagus. Apical part of clasper recurving, directed downwards and sharply pointed, with a large and sharply edged clasper hollow. Aedeagus standing erect between claspers, adjacent to anal valves, in holotype reaching far above claspers, in paratype just reaching above dorsal margin of clasper. Aedeagus (fig. 130) almost straight, but strongly, almost angularly, curved down towards its distinctly incised apex (fig. 131). Aedeagus with slender lateral crests and a weak dorsal ridge.

Measurements: Body length: 16.0 & 16.4 mm; tegmen length: 19.3 & 21.1 mm; head length: 1.2 mm; pronotum length: 1.7 & 1.8 mm; mesonotum length: 3.4 & 3.8 mm; head width: 3.3 & 3.5 mm; width of pronotal collar: 4.3 & 4.4 mm.

Distribution (fig. 129). – *P. novariae* is only known from Eliptamin valley, in the central mountain ranges of western Papua New Guinea.

Etymology. – The name *novariae* is derived from the latin words novem (nine) and ariae (areas) and refers to the nine apical areas of tegmen.

Papuapsaltria dolabrata sp. n.
(figs. 129, 137-146)

Type material. – Holotype ♂: 'INDONESIA / Irian Jaya / A.J. de Boer / A.L.M. Rutten & / R. de Vos' [print]; ' Roon Island / YENDE / 60 m. at light / 7.xi.1993' [print], ZMAN. – Paratypes: IRIAN JAYA: same data as holotype 2♂, ZMAN; Etna baai, 25.xi.1939, Nieuw Guinea Exp., KNAG 1939, 2♂, RMNH; Roon, Fruhstorfer, 1♂, 1♀, BMNH; Waigeu, Camp Nok, 2500 ft., iv.1938, L.E. Cheesman, 3♂, 5♀, BMNH; same data 1♂, 1♀, ZMAN; same data but v.1938, 3♀.

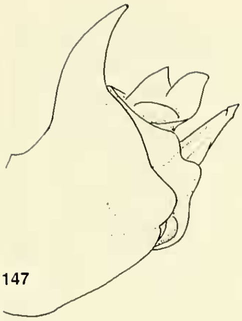
P. dolabrata closely resembles *P. baasi* in size and shape of body, but shares a wide gap between operculum and abdomen with *P. novariae*. *P. dolabrata* is easily separated from these two species by its sharply downwards directed dorsal margin of the claspers; the distal margin of the clasper is almost continuous with the ring-shaped clasper base (lateral view). *P. dolabrata* has an extremely narrow hind margin of tegmen.

Description

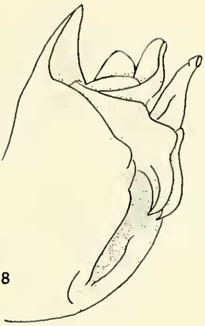
Body olive green to light brown. Females smaller than males, but with more robust head and thorax, and longer tegmina. Tegmina of males 1.1-1.2 × as long as body length, of females 1.3-1.4 ×. Male ab-

Figs. 147-155. *Papuapsaltria toxopei* sp. n.: 147, pygofer in lateral view; 148, pygofer from aslant; 149, aedeagus in lateral view; 150, aedeagal apex; 151, male caudodorsal beak in dorsal view; 152, claspers; 153, male operculum; 154, female operculum; 155, female caudodorsal beak in dorsal view.

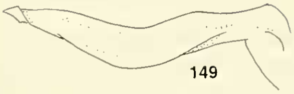
Figs. 156-164. *Papuapsaltria dioedes* sp. n.: 156, pygofer from aslant, holotype; 157, pygofer in lateral view, holotype; 158, aedeagus in lateral view, holotype; 159, male fore femur, Pengagl; 160, male caudodorsal beak in dorsal view, holotype; 161, female caudodorsal beak in dorsal view, Pengagl; 162, claspers, holotype; 163, male operculum, holotype; 164, female operculum, Pengagl.



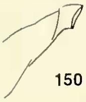
147



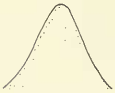
148



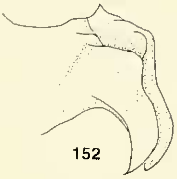
149



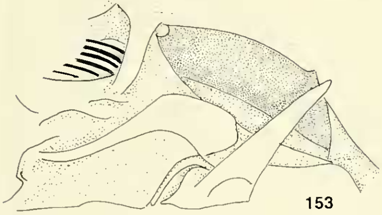
150



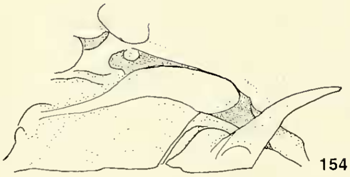
151



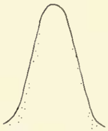
152



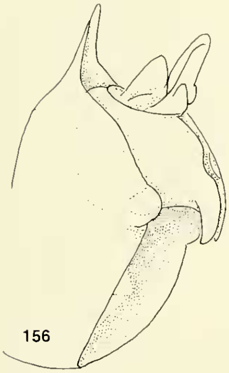
153



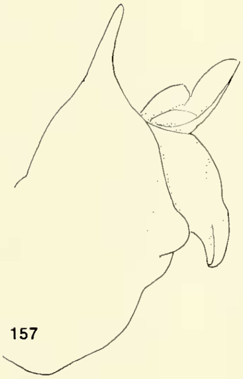
154



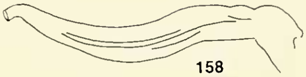
155



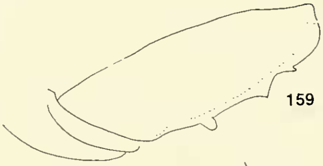
156



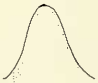
157



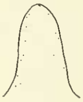
158



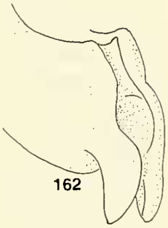
159



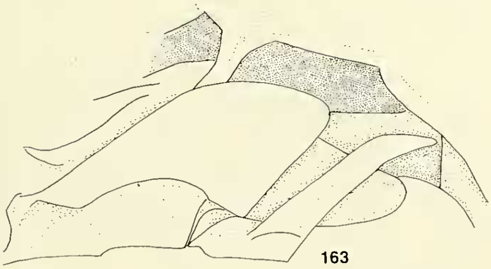
160



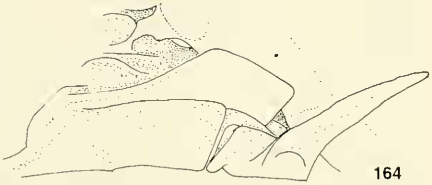
161



162



163



164

domen 1.4-1.7× as long as head and thorax, of females 1.1-1.5×.

Head: Olive green, with short red-brown setae. Postclypeus oblong, distinctly protruding beyond vertex lobes and smoothly rounded anteriorly. Anterior margin of postclypeus weakly convex, but sharply curving back at lateral corners, forming almost right angles with anterior margins of vertex lobes. Dorsal surface of postclypeus weakly undulated; laterally slightly indented. Postclypeus not swollen; anterior margin (lateral view) concave. Lateral parts of postclypeus very smooth, with some weak furrows, but almost without rows of parallel ridges along lorum. Distance between lateral ocelli 1.0-1.2× as long as distance between lateral ocellus and eye and 1.7-2.6× the width of frontal ocellus.

Legs: Femora ochraceous, tibiae and tarsi reddish. Fore femur with row of three erect spines. Proximal spine fairly long, slightly longer than middle spine, but much shorter than distance to middle spine.

Tegmina: Hyaline, with 8 apical areas and distinct and hyaline costal area. Venation often dark red-brown. Hyaline border along hind margin of tegmen extremely narrow, hardly visible.

Tymbals: Five transverse sclerotized ridges spanning the tymbal from dorsal to ventral margin and a 6th, most proximal, ridge almost reaching ventral margin. Intercalary ridges weakly developed.

Operculum: Male operculum (fig. 145) not covering tymbal cavity, leaving a very wide gap between operculum and abdomen; folded membane clearly visible in ventral view. Distal part of operculum short, less than half as long as basal part. Lateral margin straight, forming an obtuse angle with crest of basal part and angularly or convexly bent into straight distal margin. Medial margin straight, forming a narrowly rounded corner with distal margin. Meracanthus not reaching beyond folded membrane. Female operculum (fig. 146) as in male, but much shorter. Distal part as in *P. ustulata*, erect and hardly more than a continuation of the crest along distolateral corner of basal part, and only slightly amplifying mesiad to less than 1/5× as long as basal part.

Abdomen: Male abdomen hardly inflated. First tergite very short, almost completely hidden under metanotum middorsally. Medial part of 2nd tergite about 2× as long as lateral parts. Anterior margin of 2nd tergite weakly concave medially. First and 2nd sternites not adjacent. Auditory capsules weakly swollen, and hardly or not visible in dorsal view. Female caudodorsal beak in dorsal view (fig. 143) broadly triangular and rounded, almost pointed, at apex. Ovipositor sheaths almost reaching to apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 139. Dorsal margin straight, continuous with, or concavely bent into, slender caudodorsal beak. Distal margin weakly convex between caudodorsal beak and lateral protuberance, and concavely bent into margin of beak. Caudodorsal beak in dorsal view (fig. 142) broad and triangular, almost rectangular at apex. Lateral lobe of pygofer slightly curved inwards, but recurving towards ventral margin, forming a very large, weakly indented, and lobate laminiform protuberance, almost triangular in lateral view. Pygofer forming a small but distinct rectangular corner just below this protuberance. Ventral margin of pygofer straight. Ventral half of pygofer opening narrow V-shaped (fig. 138), ventral margins converging to a sharp angle at base of pygofer opening. Claspers quite different from the three foregoing species. Whereas in these three species the dorsal margin of the clasper part, which bends around aedeagus, ends in almost right angle on the fused ring-shaped clasper base (see fig. 144), in *P. dolabrata* this margin merges with the basal ring under a very slight angle (fig. 152). Moreover, the apical part of clasper is less strongly bent down than in the three foregoing species. Claspers pick axe-shaped almost parallel, only slightly diverging near apices. Apical part of clasper recurved and sharply pointed, with a large and sharply edged clasper hollow. Claspers closely encircling aedeagus at their bending point. Aedeagus, unlike the three foregoing species, not erect between claspers, but slightly directed posteriad. Aedeagus (fig. 149) weakly S-curved, with slender lateral crests and a very distinct, rounded dorsal ridge. Aedeagus weakly incised at apex; aedeagal pore almost round (fig. 150).

Measurements: Body length ♂: 14.1-14.9 mm ($\bar{x}$ 14.4 mm ± 0.3), ♀: 12.1-14.1 mm ($\bar{x}$ 12.8 mm ± 0.6); tegmen length ♂: 16.1-17.2 mm ($\bar{x}$ 16.8 mm ± 0.5), ♀: 16.0-18.6 mm ($\bar{x}$ 17.1 mm ± 0.8); head length ♂: 1.2-1.5 mm ($\bar{x}$ 1.3 mm), ♀: 1.2-1.6 mm ($\bar{x}$ 1.4 mm); pronotum length ♂: 1.5-1.7 mm ($\bar{x}$ 1.6 mm), ♀: 1.4-1.8 mm ($\bar{x}$ 1.7 mm); mesonotum length ♂: 2.7-3.1 mm ($\bar{x}$ 2.9 mm), ♀: 2.7-3.2 mm ($\bar{x}$ 2.9 mm); head width ♂: 3.1-3.3 mm ($\bar{x}$ 3.2 mm), ♀: 3.1-3.5 mm ($\bar{x}$ 3.3 mm); width of pronotal collar ♂: 3.7-4.1 mm ($\bar{x}$ 3.9 mm), ♀: 3.8-4.4 mm ($\bar{x}$ 4.1 mm).

Distribution (fig. 129). – *P. dolabrata* is distributed in western New Guinea, recorded from Etna Bay, Roon Island, and Waigeu Island, but not from the intermediate Birds Head peninsula.

Etymology. – Dolabrata means shaped as a dolabra (Latin) pickaxe. The name refers to the shape of the claspers.

Papuapsaltria toxopei sp. n.
(figs. 4, 147-155)

Type material. – Holotype: 'Neth. Ind.-American /

New Guinea Exped. / Mist Camp 1800 m / 23.i.1939 L.J. Toxopeus' [print]; 'Paratype' [print, orange label]; '*Baeturia / toxopeusi*' [written]; 'Mus. Leiden' [print], ♂, RMNH. Paratype: IRIAN JAYA: same data as holotype but 19.i.1939 and without identification label, 1♀ paratype *B. toxopeusi*, RMNH.

P. toxopei presumably belongs to this genus, as is indicated by the small male opercula and short femoral spines, but its phylogenetic position within the genus is not clear. *P. toxopei* is very similar, and presumably closely related, to the four foregoing species. The hook-shaped and sharply pointed claspers of *P. toxopei* somewhat resemble those of *P. woodlarkensis*, but similar claspers occur in several related genera.

Description

Body reddish brown, mesonotum greenish. Female smaller than male, but with more robust head and thorax, and longer tegmina. Tegmina of male 1.3× as long as body length, of female 1.5×. Male abdomen 1.5× as long as head and thorax, of female 1.2×.

Head: Vertex and postclypeus with short red setae. Postclypeus angularly protruding. Anterior margin of postclypeus almost continuous with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) concave. Vertex with fairly distinct diverging fissures. Distance between lateral ocelli 0.9-1.0× as long as distance between lateral ocellus and eye and 1.5-1.9× the width of frontal ocellus.

Legs: Fore femur with row of three erect spines. Most proximal spine very short, slightly longer than middle spine, but much shorter than distance to middle spine.

Tegmina: Hyaline, with 8 long and slender apical areas, a distinct hyaline costal area, and a broad hyaline border along hind margin.

Tymbals: Six slightly sclerotized parallel ridges spanning the tymbal from dorsal to ventral margin, and a 7th, most proximal, ridge almost reaching ventral margin. Lateral band of seven intercalary ridges weakly developed.

Opercula: Male operculum (fig. 153) very small, not covering tymbal cavity in ventral view, leaving a wide gap between operculum and abdomen; folded membrane exposed in ventral view. Distal part of operculum narrow, and angularly oblong, shorter than basal part. Operculum not reaching medially of meracanthus. Lateral margin very long and straight, gradually curving into crest of basal part and forming an obtuse angle with short and straight distal margin. Medial margin straight, distomedial corner angularly rounded. Meracanthus very long, reaching beyond anterior margin of abdomen. Female operculum (fig. 154) very similar to that of male, but with shorter and broader distal part.

Abdomen: Male abdomen long and slender, weakly inflated. First tergite not hidden under metanotum. Medial part of 2nd tergite less than 2× as long as lateral parts. Anterior margin of 2nd tergite straight medially. First and 2nd sternites not adjacent. Auditory capsules strongly inflated and protruding, visible in dorsal view. Female caudodorsal beak in dorsal view (fig. 155) long and slender, rounded at apex. Ovipositor sheaths not reaching to apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 147. Dorsal margin convex, concave near base, and continuous with convexly bent caudodorsal beak. Distal margin weakly convex, forming an obtuse angle with concave margin of beak. Ventral margin straight. Ventral margins weakly converging to base of pygofer; basal part of pygofer opening V-shaped (fig. 148). Caudodorsal beak in dorsal view (fig. 151) slender, triangular, narrowly rounded at apex. Lateral lobe of pygofer strongly curving inwards towards end of distal margin, forming a bluntly rounded and distinctly swollen protuberance. Claspers (fig. 152) hook-shaped and parallel, only slightly diverging near sharply pointed apices. Dorsal part of clasper forming an angularly protruding corner, bending around aedeagus. Apical part of clasper smoothly rounded, lobate, with large and sharply edged clasper hollow. Aedeagus (fig. 149) weakly S-curved, strongly curved down near apex, with long and slender lateral crests and distinct dorsal ridge. Lateral crests curving upwards at their distal ends and fusing to a very small collar at apical bending point of aedeagus. Aedeagal pore round.

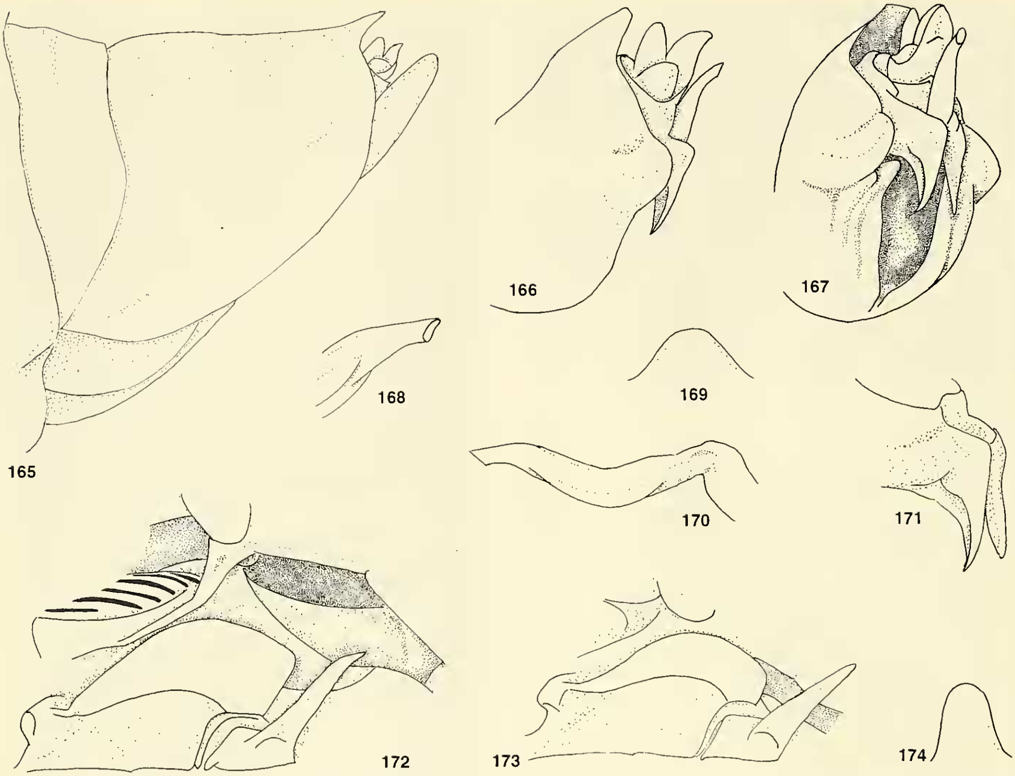
Measurements: Body length ♂: 19.4 mm, ♀: 17.2 mm; tegmen length ♂: 23.5 mm, ♀: 25.0 mm; pronotum length ♂: 1.7 mm, ♀: 2.1 mm; mesonotum length ♂: 3.8 mm, ♀: 3.0 mm; head length ♂: 1.2 mm, ♀: 1.5 mm; head width ♂: 3.4 mm, ♀: 3.9 mm; width of pronotal collar ♂: 4.8 mm, ♀: 5.7 mm.

Distribution (fig. 4). – *P. toxopei* is known from only one locality in northern Irian Jaya.

Etymology. – This species is named in honour of Mr L.J. Toxopeus who collected the holotype, and the types of several other species on which the current revision of the '*Baeturia* and related genera complex' is based.

Papuapsaltria dioedes sp. n.
(figs. 4, 156-164)

Type material. – Holotype ♂: 'New Guinea: NE / Mur Mur P. 2800 m / 28.xii.67-6.i.68' [print]; 'Tawi / Collector / BISHOP' [print], BPBM; Paratypes: PAPUA



Figs. 165-174. *Papuapsaltria woodlarkensis* sp. n.: 165, female genital segment in lateral view, paratype; 166, pygofer in lateral view, holotype; 167, pygofer from aslant, holotype; 168, aedeagal apex, paratype; 169, male caudodorsal beak in dorsal view, holotype; 170, aedeagus in lateral view, paratype; 171, claspers, holotype; 172, male operculum, holotype; 173, female operculum, paratype; 174, female caudodorsal beak in dorsal view, paratype.

NEW GUINEA: 5°15' S / 141°05' E, 2280 m, 4.v.1970, O. McCaw, 1♂, Moul; Bosavi Mt., 2300 m, 7.v.1973, J.L. Gressitt & Goya, 1♂, BPBM; Giluve, 2700 m, J. & M. Sedlacek, 1♂, ZMAN; Giluve Mt., 2500-2650 m, 28.v.1963, J. Sedlacek, 1♂, BPBM; same data but 2500-2750 m, 30.v.1963, 1♀, BPBM; Kepilam, 2420-2540 m, 21.vi.1963, J. Sedlacek, 1♀, BPBM; same data but 2450-2600 m, 22.vi.1963, 1♀, ZMAN; Kiunga, 5°15' S / 141°05' E, 7500 ft, 4.v.1970, O. McCaw, 1♂, Moul; Kubor Range, W Highlands, 2950 m, 23.v.1966, J.L. Gressitt, 1♂, BPBM; Wilhelm Mt., east slopes, Pengagl Camp, 2770 m, 17.vii.1959, sixth Archbold Exped. to Papua New Guinea, L.J. Brass, 1♂, AMNH; same data but 26.vii.1959, 2♀, AMNH.

The generic allocation of this species is somewhat uncertain. *P. dioedes* shares the supposed synapomorphous very short proximal spine on the fore femur with most species of *Papuapsaltria*, while the tegmina, with very long and slender apical areas and a very broad hyaline border, also indicate a relation with this genus. For these reasons the species is preliminary included in *Papuapsaltria*. However, its claspers are very similar to those of *Guineapsaltria pennyi*. The male opercula somewhat resemble those of *Guineapsaltria chinai* and those of *P. goniodes* and *P. angulata*.

Description

Body light yellowish brown to reddish brown. Females smaller than males, but with more robust head and thorax, and longer tegmina. Tegmina of males 1.1-1.4× as long as body length, of females 1.5-1.6×. Male abdomen 1.4-2.0× as long as head and thorax, of females 1.1-1.4×.

Head: Vertex and postclypeus with short red setae. Postclypeus angularly protruding beyond vertex lobes. Anterior margin of postclypeus sharply curving back at lateral corners, forming almost right angles with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) concave. Vertex with fairly distinct diverging fissures. Distance between lateral ocelli 0.9-1.3× as long as distance between lateral ocellus and eye and 1.4-2.5× the width of frontal ocellus.

Legs: Fore femur very slender (fig. 159) with row of three erect spines. Most proximal spine extremely short, rudimentary, often shorter than middle spine and much shorter than distance to middle spine.

Tegmina: Hyaline, with 8 long and slender apical areas, a distinct hyaline costal area and a very broad hyaline border along hind margin.

Tymbals: Six slightly sclerotized parallel ridges spanning the tymbal from dorsal to ventral margin. Lateral band of seven intercalary ridges weakly developed.

Opercula: Male operculum (fig. 163) quite large, but only partly covering tymbal cavity and leaving a wide gap between operculum and abdomen; folded membrane only partly visible in ventral view. Distal part of operculum fairly long, more than twice as long as basal part, and medially elongate, with greatest length at medial margin. Operculum not reaching medially of meracanthus. Lateral margin long and straight, forming an obtuse angle with crest of basal part, close to distolateral corner of basal part, and convexly bent into much shorter, straight distal margin. Medial margin long and straight, distomedial corner almost rectangular. Meracanthus reaching beyond operculum. Female operculum (fig. 164) very short, its distal part shorter than basal part and angularly oblong. Distolateral corner rounded, distomedial corner rectangular, medial margin very short.

Abdomen: Male abdomen strongly inflated. First tergite very short, partly hidden under metanotum. Medial part of 2nd tergite about twice as long as lateral parts. Anterior margin of 2nd tergite strongly concave medially. First and 2nd sternites generally not adjacent. Auditory capsules weakly inflated. Female caudodorsal beak in dorsal view (fig. 161) narrow triangular and bluntly rounded, almost pointed at apex. Ovipositor sheaths almost reaching to apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 157. Dorsal margin weakly convex, concavely bent into straight, erect and very slender caudodorsal beak. Distal margin weakly convex, concavely bent into margin of beak. Ventral margin convex, forming a small angular corner under lateral protuberance. Ventral margins converging towards base of pygofer; basal part of pygofer opening V-shaped (fig. 156). Caudodorsal beak in dorsal view (fig. 160) very slender, oblong, and rounded at apex. Lateral lobe of pygofer strongly curving inwards towards end of distal margin, forming a weakly swollen, bluntly rounded lateral protuberance. Claspers (fig. 162) very different from other species of this genus, almost straight and parallel towards rounded apices. Claspers adjacent, but diverging at half-length, curving around aedeagus. Aedeagus not adjacent to base of anal valves. Claspers almost fused, dorsally separated by narrow furrow between aedeagus and base of anal valves. Apical part of clasper weakly curved down, with large and sharply edged ventral hollow. Aedeagus (fig. 158) weakly S-curved, with long and slender lateral crests. Aedeagal pore round.

Measurements: Body length ♂: 20.0-26.5 mm ($\bar{x}$ 22.3 mm ± 2.3), ♀: 18.2-21.1 mm ($\bar{x}$ 20.0 mm ± 0.9); tegmen length ♂: 23.6-31.4 mm ($\bar{x}$ 27.1 mm ± 2.4), ♀: 29.1-33.3 mm ($\bar{x}$ 31.0 mm ± 1.5); head length ♂: 1.3-1.7 mm ($\bar{x}$ 1.4 mm), ♀: 1.5-1.8 mm ($\bar{x}$ 1.7 mm); pronotum length ♂: 1.8-2.5 mm ($\bar{x}$ 2.1 mm), ♀: 2.3-2.8 mm ($\bar{x}$ 2.5 mm); mesonotum length ♂: 4.2-5.2 mm ($\bar{x}$ 4.7 mm), ♀: 4.7-5.8 mm ($\bar{x}$ 5.1 mm); head width ♂: 3.4-4.1 mm ($\bar{x}$ 3.7 mm), ♀: 4.1-4.3 mm ($\bar{x}$ 4.2 mm); width of pronotal collar ♂: 5.3-7.0 mm ($\bar{x}$ 5.8 mm), ♀: 6.5-7.3 mm ($\bar{x}$ 6.8 mm).

Distribution (fig. 4). – *P. dioedes* is found in the central mountain ranges of western Papua New Guinea, at high altitudes, and on Mt. Bosavi, just south of these mountain ranges.

Etymology. – Dioedes (Greek) means swollen and refers to the swollen abdomen of this species.

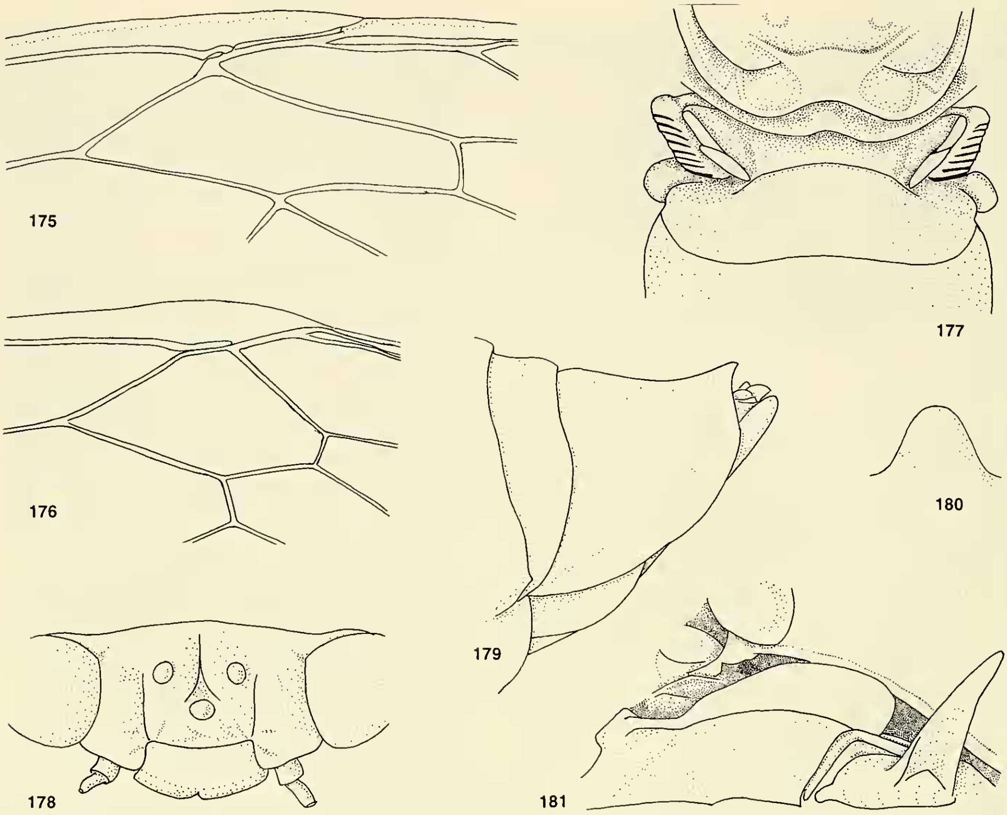
Papuapsaltria woodlarkensis sp. n.
(figs. 4, 10, 165-174)

Type material. – Holotype ♂: 'NEW GUINEA: PAPUA / Woodlark (Murua) / Kulumandau Hill / Feb. 3. 1957' [print]; 'W.W. Brandt / Collector' [print], BPBM. – Paratypes: WOODLARK ISLAND: same data as holotype 1♂, 1♀, ZMAN; 2♀, BPBM; same data but 28-30.i.1957, 1♀; 10.ii.1957, 1♀; 16.ii.1957, 2♀; 25.ii.1957, 1♀; 7-13.iii.1957, 3♀; 12.iii.1957, 3♀; 16-22.iv.1957, 1♂, 1♀, all BPBM; Kulumandau, 0-100 m, 3.xi.1956, 5th Archbold Exped. to New Guinea, L.J. Brass, 1♀, AMNH; same data but 10.xi.1956, 1♂, 1♀, AMNH.

P. woodlarkensis is easily recognized by the conical, thorn-shaped, and inwardly curved protuberances at the ventral margin of the pygofer.

Description

Body of males almost uniformly ochraceous-brown, but tinged with green. Females more reddish brown or bicolorate, with greenish head and thorax and reddish brown abdomen. Females distinctly smaller than males, but with more robust head and thorax, and longer tegmina. Tegmina of males 1.0-1.1× as long as body length, of females 1.2-1.3×. Male abdomen 1.5-1.6× as long as head and thorax, of females 1.2-1.3×.



Figs. 175-181. 175. *Papuapsaltria spinigera* sp. n.: first ulnar area of right tegmen, holotype. 176-181. *Papuapsaltria phyllophora* (Blöte, 1960): 176, first ulnar area of right tegmen, Bokondini; 177, male first and second tergite in dorsal view, Bokondini; 178, male head in dorsal view, Bokondini; 179, female genital segment in lateral view, Bokondini; 180, female caudodorsal beak in dorsal view, Bokondini; 181, female operculum, Bokondini.

Head: Postclypeus slightly angularly protruding, smoothly rounded anteriorly, its anterior margin weakly convex, almost continuous with anterior margins of vertex lobes. Postclypeus not swollen; anterior margin (lateral view) straight. Rows of short parallel ridges form a broad, though weakly developed, band along lorum. Distance between lateral ocelli 0.9-1.2× as long as distance between lateral ocellus and eye and in males 2.0-2.2 ×, in females 2.2-3.1 ×, the width of frontal ocellus.

Tegmina: Hyaline, with 8 long and slender apical areas, a fairly distinct costal area, and a very broad hyaline border along hind margin.

Legs: Fore femur (fig. 10) with row of three or four erect spines, diminishing in length towards tibia. Proximal spine fairly long, distinctly longer than middle spine and only slightly shorter than distance to middle spine.

Tymbals: Five parallel transverse sclerotized ridges spanning the tymbal from dorsal to ventral margin and a 6th ridge almost reaching ventral margin. Six short intercalary ridges clearly visible.

Opercula: Male operculum (fig. 172) not covering tymbal cavity in ventral view, leaving a wide gap between operculum and abdomen; folded membrane clearly visible in ventral view. Distal part of operculum angularly oblong and distinctly longer than basal part. Lateral margin long and straight, convex to base, ending in almost right angle on crest of basal part and reaching that crest close to lateral corner. Distal part of basal crest very short, and lower than its lateral part. Distolateral corner rounded, distal and medial margins straight, distomedial corner rectangular. Meracanthus longer than operculum, but not reaching to margin of abdominal segment 2. Female operculum (fig. 173) resembling that of male, but much shorter, with its distal part shorter than basal part, and oblong. Lateral margin as in male. Distal margin weakly convex, medial margin short and straight.

Abdomen: Male abdomen strongly inflated. First tergite rather long; medially about half as long as 2nd tergite. Anterior margin of 2nd tergite weakly convex medially. First and 2nd sternites not adjacent. Auditory capsules weakly developed, hardly protruding and not visible in dorsal view. Female abdomen stout. Female caudodorsal beak (fig. 174) oblong and rounded at apex. Ovipositor sheaths reaching distinctly beyond apex of caudodorsal beak (fig. 165).

Male genitalia: Pygofer in lateral view as in fig. 166. Dorsal margin concave, but convexly, almost angularly, bent into straight, short, and stout caudodorsal beak. Distal margin weakly convex between caudodorsal beak and lateral protuberance, forming an obtuse angle with straight margin of caudodorsal beak. Caudodorsal beak in dorsal view (fig. 169) short and broad, weakly convex, almost truncate at apex. Lateral lobe of pygofer with large swollen and bluntly rounded protuberance. Ventral part of pygofer lobe strongly curving inwards towards ventral margin, forming a slender conically rounded, almost thorn-shaped and inwardly directed, protrusion just below lateral protuberance (fig. 167). This protrusion is not visible in lateral view. Ventral margin of pygofer in lateral view weakly concave below lateral protuberance, but convex to base. Ventral half of pygofer opening narrowly oblong, forming a distinctly swollen ridge along its margins (fig. 167). Claspers (fig. 171) very short, hardly reaching beyond pygofer, diverging towards sharply pointed and downwardly directed apices. Clasper forming a weak dorsal crest. Rectangular distodorsal corner of that crest bending mesiad, distally of aedeagus and supporting aedeagus in upright position. Distal margin of clasper almost straight. Apical part of clasper with large, sharply edged hollow, ending at base in weak lateral swelling. Clasper base forming a ring-shaped collar around base of anal valves, which is medially sharply indented around aedeagus. Aedeagus standing erect between claspers, close to anal valves, its apical part slightly curving away from anal valves. Aedeagus (fig. 170) strongly S-curved, with long and distinct lateral crests and a weak dorsal ridge. Apex of aedeagus weakly pointed in lateral view, with oval, almost round, pore (fig. 168).

Measurements: Body length ♂: 19.7-21.0 mm ($\bar{x}$ 20.3 mm ± 0.5), ♀: 18.0-19.8 mm ($\bar{x}$ 18.9 mm ± 0.6); tegmen length ♂: 20.5-21.8 mm ($\bar{x}$ 21.2 mm ± 0.5), ♀: 22.6-24.5 mm ($\bar{x}$ 23.3 mm ± 0.6); head length ♂: 1.4-1.6 mm ($\bar{x}$ 1.5 mm), ♀: 1.6-1.8 mm ($\bar{x}$ 1.7 mm); pronotum length ♂: 2.2-2.3 mm, ♀: 2.2-2.5 mm ($\bar{x}$ 2.3 mm); mesonotum length ♂: 4.0-4.4 mm ($\bar{x}$ 4.2 mm), ♀: 4.2-4.7 ($\bar{x}$ 4.4 mm); head width ♂: 4.0-4.4 mm ($\bar{x}$ 4.2 mm), ♀: 4.3-5.0 mm ($\bar{x}$ 4.8 mm); width of pronotal collar ♂: 5.2-5.7 mm ($\bar{x}$ 5.5 mm), ♀: 5.7-6.4 mm ($\bar{x}$ 6.0 mm).

Distribution (fig. 4). – *P. woodlarkensis* is presumably endemic to Woodlark Island of the D'Entrecasteaux islands.

Etymology. – The name of this species is derived from the type locality: Woodlark island.

Papuapsaltria phyllophora (Blöte, 1960) comb. n. (figs. 4, 176-190)

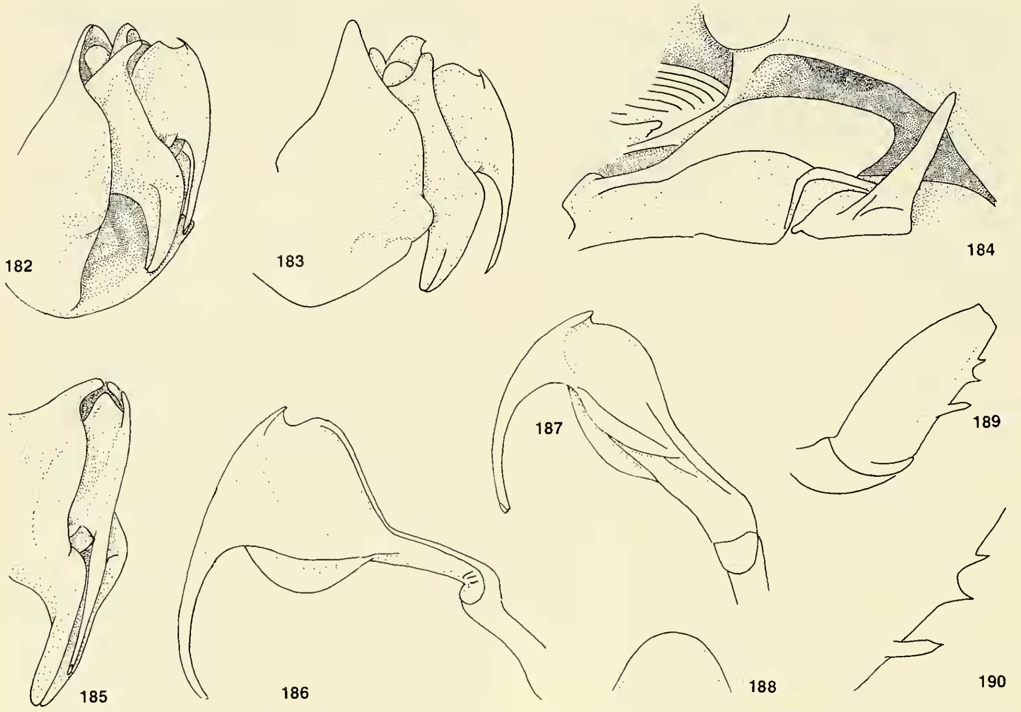
Baeturia phyllophora Blöte, 1960: 79, figs. 45, 46; Duffels & Van der Laan 1985: 254; De Boer 1993a: 16.

The generic allocation of this species is dubious. *P. phyllophora* shares none of the apomorphies on which any of the genera of the '*Baeturia* and related genera complex' are based. Furthermore, the apomorphy of that complex as a whole, an S-curved aedeagus with wing-shaped lateral crests, can hardly be recognized in the strongly deviating aedeagus of *P. phyllophora*; this deviating shape is here regarded as autapomorphous. The small male opercula and smoothly vaulted vertex suggest that the species either belongs to *Guineapsaltria* or to *Papuapsaltria*. The species is preliminary included in *Papuapsaltria* since its ocelli are more closely together than is generally the case in *Guineapsaltria*. Current phylogenetic analysis concerning all species of the '*Baeturia* and related genera complex' indicate that *P. phyllophora* either as the sister group of *Guineapsaltria*, or as part of *Papuapsaltria* both belong to the most parsimonious solutions. Males and females of *P. phyllophora* can easily be recognized by a swelling of the costa at the distal end of the first radial area, and by the quintangular-shaped second ulnar area. Males are unmistakable by their peculiar aedeagus.

Description

Body of males unicoloured red-brown or olive green, of females often darker brown or greenish. Females on average slightly longer than males, but with distinctly more robust head and thorax and longer tegmina. Tegmina of males 1.2-1.4× as long as body length, of females 1.3-1.5×. Male abdomen 1.2-1.5× as long as head and thorax, of females 1.0-1.2×.

Head (fig. 178): Reddish brown or greenish, often reddish along anterior margins of postclypeus and vertex lobes. Vertex and postclypeus with short red-brown setae. Postclypeus very broad in dorsal view, 3.0-4.3× as broad as long and oblong-shaped, hardly protruding beyond vertex lobes. Anterior margin of postclypeus almost continuous with anterior margins of vertex lobes. Postclypeus not swollen, its anterior margin (lateral view) concave. Lateral surface of postclypeus quite smooth, with only weakly developed rows of parallel ridges. Distance between lateral ocelli



Figs. 182-190. *Papuapsaltria phyllophora* (Blöte, 1960): 182, pygofer from aslant, Bokondini; 183, pygofer in lateral view, Bokondini; 184, male operculum, Bokondini; 185, claspers and aedeagus, Bokondini; 186, aedeagus in lateral view, Wau; 187, aedeagus from aslant, Wau; 188, male caudodorsal beak in dorsal view, Bokondini; 189, male fore femur, Bokondini; 190, detail male fore femur, Bokondini.

0.8-1.2 ×, though in most specimens practically 1.0 ×, distance between lateral ocellus and eye and 2.2-3.5× the width of frontal ocellus (1.3× in one female).

Thorax: Red-brown or olive green. Pronotum with very weak medial furrow. Lateral corners of pronotal collar often slightly swollen proximally.

Legs: Ochraceous, fore tibiae and tarsi reddish. Fore femur with row of three erect spines, diminishing in length towards tibia. Proximal spine slightly longer than middle spine, but shorter than distance to middle spine (figs. 189-190).

Tegmina: Hyaline, with 8 fairly short apical areas, a distinct costal area and a broad hyaline border along hind margin. Costa distinctly inflated towards distal end of first radial area. Second ulnar area definitely quintangular shaped, practically quadrangular in all related species (compare figs. 175 and 176).

Tymbals: Eight darkly sclerotized transverse ridges spanning the tymbal from dorsal to ventral margin, sometimes with a partly developed 9th ridge, closely along proximal tymbal margin. Eight short and much lighter coloured intercalary ridges seem to form a band across the tymbal.

Opercula: Male operculum (fig. 184) very small and angular, not covering tymbal cavity, and leaving a narrow gap between operculum and abdomen; folded membrane hardly visible in ventral view. Distal part of male operculum angular, oblong-shaped, and erect. Lateral margin of distal part straight, forming an obtuse angle with straight distal margin, and with crest around distolateral corner of basal part. Medial margin straight, distomedial corner angularly rounded. Meracanthus reaching well beyond operculum, to sternite 2. Female operculum (fig. 182) very similar to that of male, but slightly shorter. Distal part oblong-shaped and erect, with straight margins and almost rectangular distomedial corner.

Abdomen: Male abdomen ochraceous brown or greenish, not inflated. Segmental hind margins sometimes reddish. First tergite short and broad, partly hidden under metanotum. Medial part of 2nd tergite about 1.5× as long as lateral parts (fig. 177). Anterior margin of second tergite almost straight medially. Auditory capsules distinctly swollen and visible in dorsal view (fig. 177). First and 2nd sternites adjacent. Female abdomen more slender than that of males. Female pygofer (fig. 179) robust, in lateral view broader than long. Female caudodorsal beak in dorsal view (fig. 180) stout, broadly rounded at apex. Ovipositor sheaths reaching just beyond apex of caudodorsal beak.

Male genitalia: Pygofer in lateral view as in fig. 183. Dorsal margin slightly convex, concavely bent into stout, straight and erect caudodorsal beak. Distal margin convex between base of beak and lateral protuberance. Ventral margin almost straight. Ventral margins converge to a sharp angle at base of pygofer opening; ventral part of pygofer opening V-shaped (fig. 182). Pygofer lobe curved inwards towards distal margin and forming a small, globularly rounded, lateral protuberance. Caudodorsal beak in dorsal view (fig. 188) short, stout and broadly rounded at apex. Claspers very slender and parallel to rounded apices (fig. 185). Proximal part of clasper very long and straight, adjacent to membranous part of aedeagus. Apical part of clasper long and slender, with very shallow ventral hollow, strongly bent downwards. Dorsal part of clasper base forming a broad rounded ridge at base of anal valves. Dorsal ridges of both claspers distally elongated. Elongated parts curving mesiad, almost fusing, and forming a small hood over aedeagus. Clasper forming a rounded medial protrusion, supporting aedeagus. Aedeagus (figs. 186-187) very peculiar in shape, resembling a pick-axe; consisting of a stem ending in long and slender, recurving, dorsal and ventral protrusions. A square-shaped, semi-transparent membrane connecting dorsal protrusion with stem. This membrane strengthened by a crest along its proximal margin. Ejaculatory duct following ventral protrusion, ending in posteriorly directed pore. Aedeagus with pair of short, semi-circular, wing-shaped crests ventrally along the stem. Aedeagal crests bending slightly laterad and resting on medial protrusions of claspers.

Measurements: Body length ♂: 12.0-15.0 mm ($\bar{x}$ 13.3 mm ± 0.8), ♀: 11.6-15.8 mm ($\bar{x}$ 14.0 mm ± 1.0); tegmen length ♂: 14.6-18.2 mm ($\bar{x}$ 16.8 mm ± 0.7), ♀: 15.6-23.0 mm ($\bar{x}$ 19.1 mm ± 1.7); pronotum length ♂: 1.4-1.7 mm ($\bar{x}$ 1.5 mm), ♀: 1.5-2.0 mm ($\bar{x}$ 1.7 mm); mesonotum length ♂: 2.5-3.2 mm ($\bar{x}$ 2.8 mm), ♀: 2.8-4.1 mm ($\bar{x}$ 3.4 mm); head length ♂: 1.0-1.3 mm ($\bar{x}$ 1.1 mm), ♀ 1.1-1.6 mm ($\bar{x}$ 1.3 mm); head width ♂: 3.0-3.4 mm ($\bar{x}$ 3.2 mm), ♀: 3.1-4.1 mm ($\bar{x}$ 3.5 mm); width of pronotal collar ♂: 3.6-4.2 mm ($\bar{x}$ 3.9 mm), ♀: 4.2-5.4 mm ($\bar{x}$ 4.6 mm).

Material examined. – IRIAN JAYA: Bewani R. territ., 1200 m, 1939, W. Stüber leg., 1♀, RMNH; Bokondini, 10 km E, 40 km N of Baliem Val., 1300 m, 24.xi.1961, L. & S. Quate, 16♂, 11♀, BPBM; same data 2♂, 2♀, ZMAN; Waigeu, Camp Nok, 2500 ft, iv.1938, L.E. Cheesman, 3♂, 1♀, BMNH; same data but iv-v.1938, 2♂, 5♀, BMNH; 1♂, 1♀, ZMAN; PAPUA NEW GUINEA: Arau, 40 km E of Kainantu, 1400 m, 15.x.1959, T.C. Maa, 1♀, BPBM; Arau, Kratke Mts., Valley of Upper Wanton R., 1400 m, 7.x.1959, L.J. Brass, 1♀, AMNH; Baiyer River, 14.i.1978, R.B. Lachlan, 1♀, Moul.; Big Wau Creek, Wau, 1200 m, xii.1965, J. Sedlacek, 1♂, BPBM; Coviak Rdg., Wau, 763 m, 7.xii.1963, H. C., 1♂, 5♀, BPBM; Damanti, Finisterre Mts., Madang Dist., 3550 ft, 2-11.x.1964, M.E. Bacchus, 1♂, 1♀, BMNH; Kumur, Upper Jimi V., 1000 m, 12.vii.1955, J.L. Gressitt, 1♂, BPBM; same data but 13.vii.1955, 1♀, BPBM; Garaina S, 900-1800 m, 8-14.x.1968, 1♀, BPBM; Loloipa, Goilala, Owen Stanley Range, 11-20.xii.1957, W.W. Brandt, 1♀, BPBM; Mafulu, 4000 ft, i.1934, L.E. Cheesman, ♂ holotype *Baeturia phyllophora* Blöte, 1♀ paratype, 1♀ allotype, BMNH; Mt. Missim, Wau, 950-1300 m, xii.1965, J. Sedlacek, 1♀, BPBM; Mt. Missim, Wau, Morobe Dist., 1200-1800 m, 8.xii.1963, H. Clissold, 1♂, 1♀, ZMAN; same data but 1600 m, 17.iii.1963, Gressitt, 1♀; 1800 m, 22.iii.1966, 1♀, both BPBM; Mt. Missim, 7°16' S 146°48' E, 1500-1800 m, 7.i.1970, M. Sedlacek, 1♂, BPBM; Moroka, 1300 m, vii-xii.1895, Loria, 1♀ paratype *Baeturia phyllophora* Blöte, BMNH; Nakata Ridge, Wau, 1800 m, 18.xii.1963, H. Clissold, 1♂, 1♀, BPBM; Sattelberg, Huon Golf, 1898, Biró, 3♂, 2♀, TMB; Upper Baiane, Nr. Bulowat, 1100 m, 3.vi.1979, J.L. Gressitt, 1♀, BPBM; Wanuma, Adelbert Mts., 800-1000 m, 26.x.1958, J.L. Gressitt, 2♂, 5♀, BPBM; Wau, 1200 m, 21.xi.1963, J.L. Gressitt, 1♀, BPBM; same data but 25-30.ix.1964, J. & M. Sedlacek, 1♀; 1-9.ix.1965, J. Sedlacek, 1♀; 11.xii.1965, J. & M. Sedlacek, 1♂; 14.iii.1966, Gressitt & Wilkes, 1♂, 1♀, all BPBM; Wau, 1150-1250 m, 17.ii.1966, J. Sedlacek, 1♀, BPBM; same data but 1100-1300 m, 12.i.1966, 1♂, BPBM; Wau Area, Morobe P., iii-iv.1984, T.R. New, 1♂, Moul; Wau, 10 km S, st. 054, 22.v.1988, J. van Stalle, 1♀, ISNB; Wau, Ecology Inst., 1220 m, 18-20.vi.1981, J. van Goethem, 1♀, ISNB; Wau, Hospital Ck., 1200 m, 17.ii.1965, J. Sedlacek, 1♀, BPBM; same data but 1250-1300 m, 7.iii.1965, 1♀, BPBM; Wau, Morobe Distr., 14.-viii.1972, G.G.E. Scudder, 1♂, BPBM; same data but 1000 m, 1.iii.1963, H.W. Clissold, 1♂; 1090 m, 25.i.1963, J. Sedlacek, 1♀; 1100 m, 26.x.1961, J. Sedlacek, 1♀, all BPBM; Wau, Morobe Distr., 1200 m, 1-20.xi.1961, J. Sedlacek, 1♀; same data but 2-10.xi.1961, J. & M. Sedlacek, 1♀; 19.xi.1961, J.H. Sedlacek, 1♂; 22.xi.1961, J. & J.H. Sedlacek, 1♂; 2.xii.1961, J. Sedlacek, 1♀; 20-26.v.1962, J. Sedlacek, 1♀; 10.iii.1963, J. Sedlacek, 1♀; 15.i.1963, J. Sedlacek, 1♂, all BPBM.

Remark: The female paratype from Kokoda, mentioned by Blöte (1960) does not belong to this species but to *Guineapsaltria stylata* (Blöte, 1960) (see De Boer 1993a).

Distribution (fig. 4). – *P. phyllophora* is distributed throughout northern New Guinea, including the island of Waigeu, and the Huon and Papuan peninsulas, but is not recorded from Cendrawasih.

ACKNOWLEDGEMENTS

For the loan of material I am indebted to: Dr R. T. Schuh (AMNH); Dr W. J. Knight and Mr M. D. Webb (BMNH); Mr G. M. Nishida and Mr K. Arakaki (BPBM); Mr J. van Stalle (ISNB); Dr A. Neboiss (MVMA); Dr L. L. Deitz (NCSU); Dr A.

H. Kirk Spriggs (NMWC); Mr J. van Tol (RMNH); Dr H. Schröder (SMFD); Mr F. Heller (SMNS); Dr R. Emmrich (SMTD); Dr T. Vásárhelyi (TMB); Dr R. Danielson (ZILS); and to Mr M. S. Moulds for the loan of specimens from his private collection.

I would like to thank Mr G. Verlaan for technical assistance and and Mr D.A. Langerak for preparing the maps (figs. 3-4, 32 and 129). I am indebted to Professor Dr F. R. Schram and Dr J. P. Duffels (Instituut voor Systematiek en Populatie Biologie, University of Amsterdam) for their critical reading and comments on the manuscript. My special thanks go to the 'Uyttenboogaart-Eliasen stichting' for the grant I recieved to visit New Guinea during the months of October and November 1994. This trip enabled me to collect the holotype of *P. dolabrata.*

References

Anonymous, 1938. Atlas van tropisch Nederland: [i-ix], maps 1-31b, legenda 1-31b, 1-17. Koninklijk Nederlands Aardrijkskundig Genootschap & Topografische Dienst in Nederlandsch-Indie, Amsterdam/Batavia.

Anonymous, 1966. List of New Guinea localities: 1-19. – Bernice P. Bishop Museum, Honolulu.

Anonymous, 1968. The Times atlas of the world: i-xliii, 1-272, pls. 1-123. Times Newspapers Ltd., London.

Blöte, H.C., 1958. On the history of the genus *Baeturia* Stål (Insecta, Homoptera, Cicadidae). – Archives néerlandaises de Zoologie 13 (Suppl. 1): 262-269.

Blöte, H.C., 1960. The genus *Baeturia* Stål as represented in New Guinea (Homoptera, Cicadidae). – Zoölogische Mededelingen, Leiden 37: 61-80.

Boer, A.J. de, 1982. The taxonomy and biogeography of the *nasuta* group of the genus *Baeturia* Stål, 1866 (Homoptera, Tibicinidae). – Beaufortia 32 (4): 57-78.

Boer, A.J. de, 1986. The taxonomy and biogeography of the *conviva* group of the genus *Baeturia* Stål, 1866 (Homoptera, Tibicinidae). – Beaufortia 36 (7): 167-182.

Boer, A.J. de, 1990. *Aedeastria*, a new cicada genus from New Guinea, its phylogeny and biogeography (Homoptera, Tibicinidae), preceded by a discussion on the taxonomy of New Guinean Tibicinidae. – Beaufortia 40 (3): 63-72.

Boer, A.J. de, 1991. *Scottotympana*, a new cicad genus from New Guinea, with the description of three new species, their taxonomy and biogeography (Homoptera, Tibicinidae). – Beaufortia 42 (1): 1-11.

Boer, A.J. de, 1992a. The taxonomy and biogeography of the *viridis* group of the genus *Baeturia* Stål, 1866 (Homoptera, Tibicinidae). – Bijdragen tot de Dierkunde 61 (3): 163-183.

Boer, A.J. de, 1992b. The taxonomy and biogeography of the genus *Thaumastopsaltria* Kirkaldy, 1900, (Homoptera, Tibicinidae). – Beaufortia 43 (3): 17-44.

Boer, A.J. de, 1993a. *Guineapsaltria*, a new genus of the Australian-New Guinean region, with notes on the taxonomy and biogeography (Homoptera, Tibicinidae). – Bijdragen tot de Dierkunde 63 (1): 15-41.

Boer, A.J. de, 1993b. Ten new species of the genus *Aedeastria* De Boer, 1990, with notes on the taxonomy and biogeography (Homoptera, Tibicinidae). – Beaufortia 43 (9): 140-167.

Boer, A.J. de, 1994. The taxonomy and biogeography of the *guttulinervis* group of the genus *Baeturia* Stål, 1866 (Homoptera, Tibicinidae). – Bijdragen tot de Dierkunde 64 (2): 87-100.

Boer, A.J. de, 1995a. The taxonomy and biogeography of the genus *Gymnotympana* Stål, 1861, (Homoptera, Tibicinidae). – Invertebrate Taxonomy (in press).

Boer, A.J. de, 1995b. The taxonomy and biogeography of the genus *Mirabilopsaltria* (Homoptera, Tibicinidae). – Tropical Zoology (in press).

Distant, W. L., 1892. A monograph of Oriental Cicadidae, Parts 5-7: i-xiv, 97-158; Pls. x-xv. – Trustees Indian Museum, Calcutta.

Distant, W. L., 1906. A synonymic catalogue of Homoptera. Part 1. Cicadidae: 1-207. – Trustees British Museum, London.

Duffels, J.P. & P.A. van der Laan, 1985. Catalogue of the Cicadoidea (Homoptera, Auchenorhyncha) 1956-1980. – Series Entomologica 33: i-xvi, 1-414.

Jacobi, A., 1903. Singcicaden von Ost-Neuguinea. – Gesellschaft naturforschender Freunde Berlin, Sitzungsbericht 1903: 10-15.

Jong, M.R. de, 1985. Taxonomy and biogeography of oriental Prasiini 1: The genus Prasia Stål, 1863 (Homoptera, Tibicinidae). – Tijdschrift voor Entomologie 128: 165-191

Kato, M., 1931. Notes on the distribution of Cicadidae in Japanese Empire. – Bulletin de la Société Biogeographique de Japan 2: 36-76.

Kato, M., 1932. Monograph of Cicadidae. 1-450.

Lallemand, V., 1931. Hemiptera-Homoptera. Résultats Scientifiques du Voyage aux Indes Orientales Néerlandaises de LL. AA. RR. le Prince et la Princesse Léopold de Belgique. – Mémoirs du Musée Royal d'Histoire Naturelle de Belgique 4 (1): 71-85.

Metcalf, Z. P., 1963. General catalogue of the Homoptera, VIII. Part 2. Tibicinidae. – North Carolina State College, Raleigh, N.C.: i-iv + 1-492.

Moulds, M.S., 1990. Australian cicadas. – New South Wales University Press, Kensington: 1-217.

Moulton, J. C., 1923. Cicadas of Malaysia. – Journal Federated Malay States Museum 11: 69-182 + pls. 1-5.

Myers, J. G., 1928. Cicadidae. Insects of Samoa and other Samoan terrestrial Arthropoda 2 (2): 55-65. – Trustees of the British Museum, London.

Pigram, C. J. & H. L. Davies, 1987. Terranes and the accretion history of the New Guinea orogen. – BMR Journal of Australian Geology and Geophysics 10: 193-212.

Swofford, D.L., 1993. PAUP: Phylogenetic Analysis Using Parsimony, version 3.1.1. – Computer program distributed by the Illinois Natural History Survey, Champaign, Illinois.

Wheeler, T., 1988. Papua New Guinea a travel survival kit. – Lonely Planet Publications, Victoria, Australia: 1-340.

Received: 9 January 1995
Accepted: 4 April 1995